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1975 Report on Active and Planned Spacecraft and Experiments

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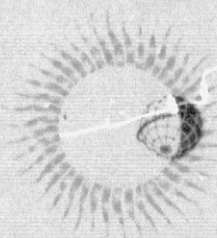
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NSSDC/WDC-A-R&S



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION • GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

NSSDC/WDC-A-R&S 75-01

1975 REPORT ON ACTIVE AND PLANNED
SPACECRAFT AND EXPERIMENTS

Edited by

Richard Horowitz
and

Leo R. Davis
National Space Science Data Center

January 1975

National Space Science Data Center (NSSDC)/
World Data Center A for Rockets and Satellites (WDC-A-R&S)
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

PREFACE

This 1975 *Report on Active and Planned Spacecraft and Experiments* provides the professional community with information on current as well as planned spacecraft activity in a broad range of scientific disciplines. The document provides brief descriptions for these spacecraft and experiments as well as approximate time periods when data are being accumulated. The performance information for active NASA and NASA-cooperative programs is based, to a large extent, on the project office status reports through September 30, 1974. The National Space Science Data Center (NSSDC) has attempted to update all performance information to that date.

We would like to acknowledge the cooperation of the acquisition scientists and others at NSSDC in obtaining information and offering suggestions for this report. We are most appreciative of the efforts of the on-site contractor at NSSDC, Programming Methods, Inc. (PMI) Facilities Management Corporation, in preparing this document for publication. Also, the cooperation of the project offices and experimenters in supplying current documentation of their spacecraft and experiments is gratefully acknowledged. We are particularly pleased with the many constructive comments and corrections we have received from interested users of this report.

NSSDC plans to publish a supplement to this report in 6 months and a cumulative edition in 1 year.

Richard Horowitz
Leo R. Davis

January 1975

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1. INTRODUCTION

1.1 PURPOSE

This 1975 *Report on Active and Planned Spacecraft and Experiments* provides the professional community with information on current and planned spacecraft activity for a broad range of scientific disciplines. By providing brief descriptions of the spacecraft and experiments as well as the approximate time periods when data are being accumulated, it is hoped that this document will be useful to many people interested in the scientific, applied, and operational uses of such data. Furthermore, for those planning or coordinating future observational programs employing a number of different techniques such as rockets, balloons, aircraft, ships, and buoys, this document can provide some insight into the contributions that may be provided by orbiting instruments. One such program in which this report will be utilized is the International Magnetospheric Study, which will occur in the 1976-1978 time interval.

1.2 CONTENTS

This document includes information concerning active and planned spacecraft and experiments known to the National Space Science Data Center (NSSDC). The information includes a wide range of disciplines: astronomy, earth sciences, meteorology, planetary sciences, aeronomy, particles and fields, solar physics, life sciences, and material sciences. These spacecraft projects represent the efforts and funding of individual countries as well as cooperative arrangements among different countries.

Descriptions of navigational and communications satellites are specifically not included in this report. Also not included are descriptions of spacecraft that contain only continuous radio beacons used for ionospheric studies. Many of these spacecraft are listed in the biweekly *SPACEWARN Bulletin**. No attempt has been made to include

*The *SPACEWARN Bulletin* is published by the World Data Center A for Rockets and Satellites, Code 601, Goddard Space Flight Center, Greenbelt, Maryland 20771, U.S.A. It is intended to serve as an international communications mechanism for the rapid distribution of information on satellites and space probes. It is published on behalf of the Committee on Space Research (COSPAR) by the International URSIGRAM and World Days Service (IUWDS), a permanent service of the International Scientific Radio Union in association with the International Astronomical Union and the International Union for Geodesy and Geophysics.

information regarding classified spacecraft or experiments. Finally, certain planned spacecraft or continuing series, for which no information except the names are known, have not been included other than to reference their launching.

The acquisition scientists at NSSDC have collected the information contained in this document from a variety of sources during the past several years; e.g., program offices, project offices, principal investigators and their staffs, publications, etc. The performance information of the spacecraft and experiments for active NASA and NASA-cooperative programs is based, to a large extent, on the project office status reports through September 30, 1974. NSSDC has attempted to update all performance information to that date. A few changes subsequent to this date may appear, depending on time availability.

1.3 ORGANIZATION

This report includes several major sections with descriptive material introducing each section.

Section 2, "Descriptions of Active and Planned Spacecraft and Experiments," is a listing of descriptions of the spacecraft and experiments that were either active or planned as of September 30, 1974, and for which NSSDC has at least minimal documentation. This section is arranged by spacecraft common name and the principal investigator's or team leader's last name.

Section 3, "Indexes for Active and Planned Spacecraft and Experiments," contains the following series of indexes to the information presented in section 2 of this report: (1) an alphabetical listing by spacecraft name, including both common and alternate names, of all active and planned spacecraft and experiments (this listing serves as an index to the location of spacecraft and experiment descriptions and includes launch dates and current status-of-operation data), (2) a listing, ordered by last name, of the investigators or team members associated with the experiments and their current affiliations, (3) a listing of current experiment institutions ordered by institution name, giving the experiments with which each is associated, and (4) a series of bar graphs and listings that provide an indication of active and planned space sciences measurements by phenomenon measured.

Section 4, "Spacecraft and Experiments Launched or Inactivated Between October 1, 1973, and September 30, 1974," contains three listings of pertinent information concerning (1) launched spacecraft, (2) spacecraft and experiments placed in an "operational off" mode, and (3) spacecraft and experiments that became "inoperable."

All of these major sections were generated from NSSDC automated files. Several words and phrases used in these sections are defined in Appendix A - Definitions. A more comprehensive list of the abbreviations and acronyms defined in this document are included in Appendix B - Glossary of Abbreviations and Acronyms.

1.4 AVAILABILITY OF THIS REPORT

Upon request, NSSDC will provide copies of this report and future supplements to an individual or organization resident in the United States who can establish a need (in writing or by telephone) for this information. The same services are available to persons outside the United States through the World Data Center A for Rockets and Satellites (WDC-A-R&S). The official addresses for requests are printed on the inside front cover of this report.

Recipients are requested to inform potential users of the availability of this report. Because of continuing costs involved in publishing a document of this size on a periodic basis, NSSDC encourages individuals collocated in the same organization to share this document.

1.5 REQUEST FOR ADDITIONS/CORRECTIONS

NSSDC continually strives to increase the usefulness of this report by improving the spacecraft and experiment descriptions and by including additional spacecraft and experiments as they become known to NSSDC. This report is complete and reasonably accurate concerning NASA and NASA-cooperative programs; however, descriptions of other spacecraft and experiments may be rather terse and incomplete because of a lack of information available to NSSDC. Although in some cases the status of these other spacecraft or experiments may have been in doubt, nevertheless it has been included here. It should be noted that the information concerning the planned spacecraft and experiments is frequently general in nature and subject to change.

NSSDC would welcome comments as to errors or omissions in this report. Recommendations regarding the overall contents and organization of this report would also be appreciated. In particular, it is hoped that principal experimenters and project offices will cooperate in bringing such matters to NSSDC's attention.

2. DESCRIPTIONS OF ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS

This section contains descriptions of spacecraft and experiments pertinent to this report that were either active or planned as of September 30, 1974, and for which NSSDC has at least minimal documentation. A few changes subsequent to this date may appear, depending on time availability. The descriptions are sorted first by spacecraft common name. Within each spacecraft listing, experiments are ordered by the principal investigator's or team leader's last name. Explorer spacecraft prelaunch generic names are used as common names; e.g., IMP-H instead of Explorer 47. If the common name, as used by NSSDC, is not known, it can be found by referring to an alternate name found in the Index of Active and Planned Spacecraft and Experiments (section 3.1).

Each spacecraft or experiment entry in this section is composed of two parts -- a heading and a brief description. The headings indicate status and data acquisition rate and list characteristics of satellites and experiments, respectively. The status information is based on quarterly reports from various spacecraft project offices as well as personal contacts with the experimenters and program personnel. Definitions of many of the terms used in this section are included in Appendix A.

2.1 CONTENTS OF SPACECRAFT ENTRIES

The heading for each active orbiting spacecraft description in this section includes two sets of orbit parameters. Each set of parameters consists of epoch date, orbit type, orbit period, apoapsis, periapsis, and inclination for the spacecraft. No orbit parameters are listed for lander and fly-by missions. In addition, the heading contains the spacecraft weight, launch date, launch site, launch vehicle, spacecraft common and alternate names, NSSDC ID code, sponsoring country and agency, and spacecraft personnel (project manager and project scientist). The last reported change in spacecraft status and data acquisition rate is also shown in the heading along with the date the change occurred. The spacecraft status is given as either "NORMAL" or "PARTIAL," while the spacecraft data acquisition rate is given as either "STANDARD" or "SUBSTANDARD." The spacecraft brief description is immediately below each heading.

The heading for each planned orbiting spacecraft description in this section includes a set of planned orbit parameters (orbit type, orbit period, apoapsis, periapsis, and inclination), a planned launch date, launch site, launch vehicle, spacecraft weight, spacecraft common and alternate names, NSSDC ID code, sponsoring country and agency, and spacecraft personnel (project manager and project scientist). The

last reported status of the spacecraft project is based on information received from the various spacecraft project offices and other sources. The spacecraft status is given as "APPROVED MISSION" or "PROPOSED MISSION." The spacecraft brief description is immediately below each heading.

2.2 CONTENTS OF EXPERIMENT ENTRIES

Each experiment entry heading includes the experiment name, the NSSDC ID code, and the name and affiliation or location of the principal investigator or team leader for the experiment as well as other investigators or team members associated with the experiment. The last reported change in the experiment status and data acquisition rate is shown here. For active spacecraft, the experiment status is given as either "NORMAL" or "PARTIAL," and the experiment data acquisition rate is given as either "STANDARD" or "SUBSTANDARD." For all planned spacecraft experiments, the last reported state is shown as "PRELAUNCH." The experiment brief description is immediately below each heading.

2.3 ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENT DESCRIPTIONS

***** AD-A *****

SPACECRAFT COMMON NAME- AD-A
ALTERNATE NAMES- EXPLORER 19, 00714
NSSDC ID- 63-053A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 00/00/67.

LAUNCH DATE- 12/19/63 SPACECRAFT WEIGHT- 7. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 12/19/63
ORBIT PERIOD- 115.9 MIN INCLINATION- 78.62 DEG
PERIAPSIS- 749.000 KM ALT APOAPSIS- 2022.00 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 01/27/72
ORBIT PERIOD- 112.92 MIN INCLINATION- 78.9205 DEG
PERIAPSIS- 874. KM ALT APOAPSIS- 1768. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.W. COFFEY, JR.NASA-LARC
HAMPTON, VA
PS - R.P. FELLOWSNASA HEADQUARTERS
WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
EXPLORER 19 WAS THE SECOND IN A SERIES OF 3.66-M INFLATABLE SPHERES PLACED INTO ORBIT SOLELY FOR THE DETERMINATION OF ATMOSPHERIC DENSITIES. EXPLORER 19 WAS LAUNCHED WHILE EXPLORER 9, THE FIRST SATELLITE IN THE SERIES, WAS STILL ACTIVE, SO THAT DENSITIES IN TWO DIFFERENT PORTIONS OF THE ATMOSPHERE COULD BE SAMPLED SIMULTANEOUSLY. THE SATELLITE CONSISTED OF ALTERNATING LAYERS OF ALUMINUM FOIL AND PLASTIC FILM, UNIFORMLY DISTRIBUTED OVER THE ALUMINUM OUTER SURFACE WERE 5.1-CM BOTS OF WHITE PAINT FOR THERMAL CONTROL. A 136.620-MHZ TRACKING BEACON, WHICH WAS POWERED BY FOUR SOLAR CELLS AND WAS MOUNTED ON THE SPACECRAFT SKIN, USED THE ELECTRICALLY SEPARATED HEMISPHERES OF THE BALLOON AS AN ANTENNA. THE SPACECRAFT WAS SUCCESSFULLY ORBITED, BUT ITS APOGEE WAS LOWER THAN PLANNED. THE BEACON DID NOT HAVE SUFFICIENT POWER TO BE RECEIVED BY GROUND TRACKING STATIONS, MAKING IT NECESSARY TO RELY SOLELY ON THE SAO BAKER-NUNN CAMERA NETWORK FOR TRACKING. EXPLORER 19 IS EXPECTED TO REMAIN IN ORBIT UNTIL 1976.

***** AD-A, O'SULLIVAN, JR. *****

EXPERIMENT NAME- SATELLITE DRAG ATMOSPHERIC DENSITY

NSSDC ID- 63-053A-01

LAST REPORTED STA E- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 12/19/63.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.J. O'SULLIVAN, JR.NASA-LARC
HAMPTON, VA
OI - L.G. JACCHIASAD
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO YIELD SYSTEMATIC CHANGES IN ATMOSPHERIC DENSITY AS A FUNCTION OF ALTITUDE, LATITUDE, AND TIME BY MEASURING ATMOSPHERIC DRAG ON A LOW MASS-TO-AREA RATIO 10.7680 KG/SQ M) SATELLITE. EXPLORER 19 WAS LAUNCHED INTO A NEAR-POLAR ORBIT, SO THAT AS THE PERIGEE POINT PRECEDED, DENSITIES COULD BE SAMPLED FROM BOTH POLAR AND EQUATORIAL LATITUDES. THE ORBIT WAS ALSO SUN SYNCHRONIZED SO THAT NEAR-POLAR DENSITIES COULD ALWAYS BE OBTAINED NEAR LOCAL NOON AND MIDNIGHT. ATMOSPHERIC DENSITIES NEAR PERIGEE WERE DEDUCED FROM SEQUENTIAL OBSERVATIONS OF THE SPHERE FROM OPTICAL TRACKING. THE EXPERIMENT PERFORMED NORMALLY AFTER LAUNCH, AND GOOD DATA HAVE BEEN COLLECTED. A COMPLETE DESCRIPTION OF THE EXPERIMENT IS CONTAINED IN 'DETERMINATION OF MEAN ATMOSPHERIC DENSITIES DURING MINIMUM SOLAR ACTIVITY BY MEANS OF THE EXPLORER 19 SATELLITE,' NASA TN-D-3432, JUNE 1966.

***** AD-C *****

SPACECRAFT COMMON NAME- AD-C
ALTERNATE NAMES- PL-683J, SPHERE
EXPLORER 39, 03337
NSSDC ID- 68-066A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/00/71.

LAUNCH DATE- 06/08/68 SPACECRAFT WEIGHT- 9.4 KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 118.1 MIN
PERIAPSIS- 665.000 KM ALT

EPOCH DATE- 06/08/68
INCLINATION- 80.091 DEG
APOAPSIS- 2526.00 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 115.05 MIN
PERIAPSIS- 695. KM ALT

EPOCH DATE- 01/13/74
INCLINATION- 80.68 DEG
APOAPSIS- 2223. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.W. COFFEY, JR.NASA-LARC
HAMPTON, VA
PS - R.P. FELLOWSNASA HEADQUARTERS
WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
EXPLORER 39 WAS AN INFLATABLE SPHERE, 3.66 M IN DIAMETER, THAT WAS PLACED INTO ORBIT SOLELY FOR THE PURPOSE OF MAKING DENSITY DETERMINATIONS. THE SPACECRAFT WAS SUCCESSFULLY LAUNCHED INTO A NEARLY POLAR, HIGHLY ELLIPTICAL ORBIT. IT WAS FOLDED AND CARRIED INTO ORBIT, TOGETHER WITH EJECTION AND INFLATION EQUIPMENT, AS PART OF THE PAYLOAD OF EXPLORER 40 (NSSDC ID 68-066B). TWO DENSITY EXPERIMENTS WERE PERFORMED. ONE INVOLVED THE STUDY OF SYSTEMATIC DENSITY VARIATION, AND THE OTHER WAS CONCERNED WITH NONSYSTEMATIC DENSITY CHANGES. THE UPPER ATMOSPHERIC DENSITIES WERE DERIVED FROM SEQUENTIAL OBSERVATIONS OF THE SPHERE BY USE OF AN ATTACHED 136.620-MHZ RADIO TRACKING BEACON AND BY OPTICAL TRACKING. THE RADIO BEACON CEASED TRANSMITTING IN JUNE 1971.

***** AD-C, KEATING *****

EXPERIMENT NAME- SATELLITE DRAG ATMOSPHERIC DENSITY

NSSDC ID- 68-066A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/08/68.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.W. KEATINGNASA-LARC
HAMPTON, VA
OI - L.G. JACCHIASAD
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
BECAUSE OF ITS SYMMETRICAL SHAPE, EXPLORER 39 WAS SELECTED BY THE EXPERIMENTERS TO DETERMINE UPPER ATMOSPHERIC DENSITIES AS A FUNCTION OF ALTITUDE, LATITUDE, SEASON, AND SOLAR ACTIVITY. THE EXPERIMENT WAS PLANNED PRIOR TO LAUNCH. DENSITY VALUES NEAR PERIGEE WERE DEDUCED FROM SEQUENTIAL OBSERVATIONS OF THE SPACECRAFT POSITION USING OPTICAL (BAKER-NUNN CAMERA NETWORK) AND RADIO AND/OR RADAR TRACKING TECHNIQUES. A GOOD DISCUSSION OF THE GENERAL TECHNIQUES USED TO DEDUCE DENSITY VALUES FROM SATELLITE DRAG DATA CAN BE FOUND IN SMITHSONIAN ASTROPHYSICAL OBSERVATORY SPECIAL REPORT NO. 100, BY JACCHIA AND SLOWEY. THIS EXPERIMENT HAS DETERMINED REASONABLE DENSITY VALUES, AND IS CAPABLE OF YIELDING LONG-TERM ATMOSPHERIC DENSITY VALUES. AS EXPLORER 39 HAS AN EXPECTED ORBITAL LIFETIME OF 50 YEARS.

***** AE-C *****

SPACECRAFT COMMON NAME- AE-C
ALTERNATE NAMES- S 6C, PL-721C
ATMOSPHERE EXPLORER-C, EXPLORER 51
6977
NSSDC ID- 73-101A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

LAUNCH DATE- 12/16/73 SPACECRAFT WEIGHT- 658. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 132.5 MIN
PERIAPSIS- 159. KM ALT

EPOCH DATE- 12/17/73
INCLINATION- 69.1 DEG
APOAPSIS- 4303. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 117.92 MIN
PERIAPSIS- 139.30 KM ALT

EPOCH DATE- 07/10/74
INCLINATION- 68.115 DEG
APOAPSIS- 3039.44 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.W. GRIMESNASA-GSFC
GREENBELT, MD
PS - N.W. SPENCERNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ONE OBJECTIVE OF AE-C WAS TO INVESTIGATE THE PHOTOCHEMICAL PROCESSES ACCOMPANYING THE ABSORPTION OF SOLAR UV RADIATION IN THE EARTH'S ATMOSPHERE BY MAKING CLOSELY COORDINATED MEASUREMENTS OF REACTING CONSTITUENTS. THE MEASUREMENTS WERE ORIENTED PRIMARILY TO THE LARGELY UNEXPLORED LOW-ALTITUDE REGION BETWEEN 120 AND 300 KM. HOWEVER, PROPERTIES ABOVE 300 KM WERE ALSO EXTENSIVELY INVESTIGATED. THE EXPERIMENT PAYLOAD INCLUDED INSTRUMENTATION FOR THE MEASUREMENT OF SOLAR EUV RADIATION, NEUTRAL PARTICLE

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

COMPOSITION AND TEMPERATURE, ATMOSPHERIC DENSITY, ION COMPOSITION AND TEMPERATURE, ELECTRON CONCENTRATION AND TEMPERATURE, AIRGLOW EMISSIONS, PARTICLE FLUXES, AND THE PHOTOELECTRON ENERGY SPECTRUM. THE SATELLITE WAS A SHORT (1 M) CYLINDRICAL PRISM WITH A DIAMETER OF APPROXIMATELY 1.4 M. IN THE SPIN-STABILIZED MODE, THE SPACECRAFT'S SPIN AXIS WAS PERPENDICULAR TO THE ORBIT PLANE. POWER WAS SUPPLIED BY A SOLAR CELL ARRAY. THE SPACECRAFT USED A PCM TELEMETRY SYSTEM THAT OPERATED IN A REAL-TIME OR TAPE RECORDER MODE. AN ON-BOARD PROPULSION SYSTEM WAS USED FOR MAKING ALTITUDE CHANGES. THE SATELLITE HAD A 1-YR LIFETIME. MORE DETAILS CAN BE FOUND ON PP. 263-269 OF 'RADIO SCIENCE,' VOL. 8, NO. 4, APRIL 1973.

----- AE-C, BARTH -----

EXPERIMENT NAME- ULTRAVIOLET NITRIC-OXIDE EXPERIMENT

NSSDC ID- 73-101A-13

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.A. BARTHU OF COLORADO
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS ULTRAVIOLET NITRIC-OXIDE EXPERIMENT (UVNO) CONSISTED OF A TWO-CHANNEL FIXED-GRATING EBERT SPECTROMETER WHICH MEASURED THE AIRGLOW IN THE (1, 0) GAMMA BAND IN A 12-A REGION CENTERED AT 2150 Å. THE OBSERVED INTENSITY WAS PRODUCED BY RESONANCE FLUORESCENCE BY SUNLIGHT OF THE NITRIC-OXIDE MOLECULES IN THE INSTRUMENT'S FIELD OF VIEW. THE INTENSITY PROFILES OBTAINED YIELDED ALTITUDE PROFILES OF NITRIC-OXIDE DENSITY AS A FUNCTION OF TIME AND LOCATION. PROFILES WERE MEASURED ALONG THE TRACK OF THE SATELLITE AT ALL TIMES WHEN IT WAS ON THE SUNLIT SIDE OF THE EARTH. THE REMOTE SENSING CHARACTER OF THE UVNO EXPERIMENT PERMITTED MEASUREMENTS OF NITRIC-OXIDE TO BE MADE AT ALTITUDES BOTH ABOVE AND BELOW SATELLITE PERIGEE. AS THE SPACECRAFT SPINS, THE SPECTROMETER, WHICH LOOKED OUTWARD THROUGH THE RIM OF THE SATELLITE, REPEATEDLY HAD ITS FIELD OF VIEW CARRIED DOWN THROUGH THE ATMOSPHERE ONTO THE EARTH'S LIMB, AND ALTITUDE PROFILES OF THE EMITTED AIRGLOW INTENSITY WERE OBTAINED. BELOW SOME ALTITUDE THE MEASURED SIGNAL AT 2150 Å WAS CONTAMINATED BY RAYLEIGH SCATTERED SUNLIGHT. TO CORRECT FOR THIS CONTAMINATION, A SECOND CHANNEL MEASURED ONLY SCATTERED LIGHT INTENSITY IN A 12-A REGION CENTERED AT 2190 Å. THE TWO CHANNELS WERE OPTICALLY AND ELECTRICALLY INDEPENDENT. NITRIC-OXIDE AIRGLOW INTENSITY WAS DETERMINED BY TAKING THE DIFFERENCE BETWEEN THESE TWO MEASUREMENTS. FROM THE CORRECTED SIGNAL, NITRIC-OXIDE DENSITY PROFILES WERE OBTAINED BETWEEN APPROXIMATELY 60 KM AND 250 KM. THE SENSOR'S SPHERICAL FUSED QUARTZ TELESCOPE MIRROR HAD A 123-MM FOCAL LENGTH, AND FOCUSED INCIDENT LIGHT ON THE ENTRANCE SLIT OF THE SPECTROMETER. FROM THIS SLIT THE LIGHT STRUCK ONE HALF OF THE EBERT MIRROR AND WAS COLLIMATED ONTO THE GRATING. THE 3600-LINES-PER-MM GRATING RETURNED IT COLLIMATED TO THE OTHER HALF OF THE EBERT MIRROR, AND THE LIGHT WAS FOCUSED ON TWO EXIT SLITS. THE SPECTROMETER FIELD OF VIEW WAS 0 DEG 15 MIN BY 4 DEG 39 MIN. IN NORMAL OPERATION EACH CHANNEL WAS INTEGRATED FOR 20.8 MSEC AND WAS READ OUT ALTERNATELY AT 10.4-MSEC INTERVALS. THE INSTRUMENT HAD LINEAR RESPONSE CHARACTERISTICS, AND THE OBSERVATION OF A 1-KR EMISSION RATE PRODUCED, ON THE AVERAGE, 100 COUNTS PER INTEGRATION PERIOD IN THE 2150-Å CHANNEL AND 60 COUNTS IN THE 2190-Å CHANNEL. THE INSTRUMENT WAS PROTECTED AGAINST CONTAMINATION FROM INTERNAL SCATTERING OF OFF-AXIS UNDISPERSED LIGHT. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE UV NITRIC-OXIDE EXPERIMENT FOR THE ATMOSPHERE EXPLORER', C. A. BARTH, ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 379 (1973).

----- AE-C, BRACE -----

EXPERIMENT NAME- ELECTRON TEMPERATURE AND CONCENTRATION

NSSDC ID- 73-101A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - L.H. BRACENASA-GSFC
GREENBELT, MD

OI - R.F. THEISNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE CYLINDRICAL ELECTROSTATIC PROBE WAS A RETARDING POTENTIAL (LANGMUIR TYPE) PROBE THAT MEASURED THE CURRENT FLOWING TO THE COLLECTOR FOR A KNOWN SAWTOOTH VOLTAGE PATTERN APPLIED. FROM THIS RETARDING POTENTIAL (CURRENT VS VOLTAGE) CURVE, ELECTRON DENSITY AND ELECTRON TEMPERATURE WAS DERIVED. THIS PROBE CONSISTED OF A COLLECTOR ELECTRODE EXTENDING FROM THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING EXTENDED 23 CM FROM THE SPACECRAFT, AND THE ELECTRODE EXTENDED ANOTHER 10 CM FURTHER OUTWARD FROM THE END OF THE GUARD RING. TWO IDENTICAL PROBES WERE MOUNTED PARALLEL TO THE SPACECRAFT SPIN AXIS (SPIN AXIS WAS PERPENDICULAR TO THE ORBIT PLANE), AND THE OTHER PROBE WAS MOUNTED PERPENDICULAR TO THE SPIN AXIS. IN ADDITION TO ONBOARD ANALYSES OF THE RETARDING POTENTIAL CURVES, WHICH PROVIDE TEMPERATURES AND DENSITIES, THESE CURVES WERE TELEMETERED.

----- AE-C, BRINTON -----

EXPERIMENT NAME- BENNETT ION-MASS SPECTROMETER

NSSDC ID- 73-101A-11

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.C. BRINTONNASA-GSFC
GREENBELT, MD
OI - L.R. SCOTTNASA-GSFC
GREENBELT, MD
OI - H.W. PHARONASA-GSFC
GREENBELT, MD
OI - H.A. TAYLOR, JR.NASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS FLOWN TO MEASURE, THROUGHOUT THE AE ORBIT, THE INDIVIDUAL CONCENTRATIONS OF ALL THERMAL ION SPECIES IN THE MASS RANGE 1 TO 72 ATOMIC MASS UNITS (AMU), AND IN THE AMBIENT DENSITY RANGE FROM 5 IONS PER CC TO 5 MILLION IONS PER CC. ANY COMBINATION OF THE FOLLOWING THREE MASS RANGES, WHICH WERE EXPRESSED IN AMU, WERE SELECTED BY GROUND COMMAND -- RANGE A - 4 TO 1, RANGE B - 10 TO 2, RANGE C - 72 TO 0. EACH RANGE WAS NORMALLY SCANNED IN 1.6 SEC (APPROXIMATELY 12 KM ALONG ORBIT), BUT THE SCAN TIME PER RANGE WAS INCREASED TO 5.1 SECONDS BY COMMAND. NORMAL OPERATION CONSISTED IN SEQUENCE ABCDC (72 TO 1 AMU IN 4.6 SEC). LABORATORY AND INFIGHT DETERMINATION OF SPECTROMETER EFFICIENCY AND MASS DISCRIMINATION PERMITTED DIRECT CONVERSION OF MEASURED ION CURRENTS TO AMBIENT CONCENTRATIONS. THE EXPERIMENT'S FOUR PRIMARY MECHANICAL COMPONENTS WERE -- GUARD RING AND ION-ANALYZER TUBE, COLLECTOR AND PREAMPLIFIER ASSEMBLY, VENT, AND MAIN ELECTRONICS HOUSING. THE GUARD RING WAS NORMALLY AT GROUND POTENTIAL, BUT IT COULD BE PLACED AT -6 V BY COMMAND IF DESIRABLE, E.G., IF THE SPACECRAFT ACQUIRED A POSITIVE CHARGE. A THREE-STAGE BENNETT TUBE WITH 7 TO 5 CYCLE DRIFT SPACES WAS FLOWN AND WAS MODIFIED TO PERMIT ION CONCENTRATION MEASUREMENTS TO BE OBTAINED DOWN TO 120-KM ALTITUDE. SPECIFICALLY, A VENT WAS PROVIDED AT THE REAR OF THE SPECTROMETER, AND THE USUAL FLAT-DISK ION-CURRENT COLLECTOR WAS REPLACED WITH A STACK OF WIRE-MESH GRIDS. THE FREQUENCY OF THE 30 V PEAK-TO-PEAK R.F. VOLTAGE VARIED WITH THE MASS RANGE MEASURED -- RANGE A - 10 MHZ, RANGE B - 5 MHZ, AND RANGE C - 2.5 MHZ. INTO THE VACUUM TIGHT ALUMINA-CERAMIC CYLINDRICAL ANALYZER TUBE A SERIES OF 16 PARALLEL YUNGSTEN-MESH GRIDS WERE BRAZED. THE BALANCE BETWEEN ION-CURRENT SENSITIVITY AND MASS-RESOLUTION IN A BENNETT SPECTROMETER COULD BE ALTERED BY CHANGING APPROPRIATE VOLTAGES. THESE VOLTAGE CHANGES COULD BE CONTROLLED INDEPENDENTLY BY GROUND COMMAND FOR EACH ONE OF THE THREE MASS RANGES. PRIMARY ANALOG INSTRUMENT OUTPUT WAS A COMPARSED ION CURRENT SPECTRUM WHICH DISPLAYED THE FULL DYNAMIC RANGE OF THE AMPLIFIER SYSTEM ON A SINGLE TELEMETRY CHANNEL. ON-BOARD DATA PROCESSING PROVIDED A READ-OUT OF PRIMARY EXPERIMENT DATA IN THE FORM OF TWO DIGITAL WORDS FOR EACH PEAK IN THE ION SPECTRUM. ONE EIGHT-BIT WORD INDICATED PEAK AMPLITUDE (CURRENT) AND THE OTHER EIGHT-BIT WORD IDENTIFIED SWEEP POSITION, I.E., SPECIES IDENTIFICATION. THE WORDS WERE READ OUT IN PAIRS AT THE MAIN FRAME TELEMETRY RATE OF 16 SAMPLES PER SECOND. INSTRUMENT CONFIGURATION SELECTED FOR A PARTICULAR PASS DEPENDS PRIMARILY ON THE DATA REQUIREMENTS OF THE SCIENCE PROBLEM UNDER INVESTIGATION AND ON THE SPACECRAFT SPIN MODE. MORE COMPLETE EXPERIMENT DETAILS CAN BE FOUND IN THE PAPER 'THE BENNETT ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER -C AND -E', H. C. BRINTON ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 323-332 (1973).

----- AE-C, CHAMPION -----

EXPERIMENT NAME- ATMOSPHERIC DRAG

NSSDC ID- 73-101A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/17/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.S.W. CHAMPIONUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - F.A. MARCOSUSAF CAMBRIDGE PFS LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERIC DENSITY ACCELEROMETER EXPERIMENT OBTAINED DATA ON THE NEUTRAL DENSITY OF THE ATMOSPHERE IN THE ALTITUDE RANGE 120 TO 400 KM BY THE MEASUREMENT OF SATELLITE DECELERATION DUE TO AERODYNAMIC DRAG. THE EXPERIMENT CONSISTED OF THREE SINGLE AXIS ACCELEROMETERS. TWO OF THE UNITS WERE LOCATED IN THE SPACECRAFT X-Y PLANE AXIS, AND THE THIRD WAS ALIGNED WITH THE Z AXIS. EACH INSTRUMENT MEASURED THE ELECTROSTATIC FORCE REQUIRED TO RESTRAIN A HOLLOW CYLINDRICAL MASS UNDER EXTERNAL ACCELERATION. THE DYNAMIC RANGE OF EACH UNIT WAS 1E-10 TO 1E-12 GRAMS.

----- AE-C, DRERING -----

EXPERIMENT NAME- PHOTOELECTRON SPECTROMETER

NSSDC ID- 73-101A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.P. DOERINGJOHNS HOPKINS U
BALTIMORE, MD
OI - C.O. HASTONAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - J.C. ARMSTRONGAPPLIED PHYSICS LAB
SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT MEASURED THE INTENSITY AND ENERGY DISTRIBUTION OF THE PHOTOELECTRON FLUX IN THE THERMOSPHERE IN THE RANGE 6 TO 600 EV. THE INSTRUMENTATION CONSISTED OF TWO OPPOSITELY DIRECTED HEMISPHERICAL-ELECTROSTATIC DEFLECTORS COUPLED TO SEPARATE ELECTRON MULTIPLIER DETECTORS. THE PHOTOELECTRON ENERGY SPECTRUM WAS SCANNED BY 1-SEC SWEEPS OF THE VOLTAGE BETWEEN THE TWO HEMISPHERICAL DEFLECTION ELEMENTS OF EACH DEFLECTOR.

----- AE-C, HANSON -----

EXPERIMENT NAME- ION TEMPERATURE

NSDOC ID- 73-101A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.D. HANSONU OF TEXAS, DALLAS
DALLAS, TX
OI - D.R. ZUCCARDU OF TEXAS, DALLAS
DALLAS, TX
OI - S. SANTINIU OF TEXAS, DALLAS
DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

THE PLANAR ION TRAP, A RETARDING POTENTIAL TYPE OF INSTRUMENT, MEASURED CURRENT FLOWING TO A COLLECTOR FOR A KNOWN LINEAR VOLTAGE SWEEP TO BE APPLIED TO THE COLLECTOR. THE ION TEMPERATURE, ION DENSITY, COMPOSITION, SUPRATHERMAL ELECTRON FLUXES, AND SUPRATHERMAL ELECTRON TEMPERATURES WERE DETERMINED FROM THIS RETARDING POTENTIAL CURVE AND KNOWLEDGE OF THE VOLTAGE ON SUPPRESSOR GRIDS BETWEEN THE INSTRUMENT APERTURE AND THE COLLECTOR. THE EXPERIMENT OPERATED IN ONE MODE WHILE THE SPACECRAFT WAS SPINNING AND IN A SECOND MODE WHEN THE SPACECRAFT WAS NOT SPINNING. A COMPLETE VOLTAGE SWEEP (100V DOWN AND UP -- +23 TO 0 TO +23 V) COULD BE ACCOMPLISHED IN 3 SEC. IN THE NONSPINNING MODE, AN ADDITIONAL 3-SEC "DUMP" MODE OPERATED TO PROVIDE MEASUREMENTS FROM WHICH FRACTIONAL ION CONCENTRATION CHANGES AS SMALL AS 0.001 IONS/CC PER 130 M ALONG TRACK TRAVEL COULD BE MADE.

----- AE-C, HAYS -----

EXPERIMENT NAME- AIRGLOW PHOTOMETER

NSDOC ID- 73-101A-14

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P.B. HAYSU OF MICHIGAN
ANN ARBOR, MI
OI - G.G. SHEPHERDYORK U
TORONTO, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONTAINED A FILTER PHOTOMETER DESIGNED TO MONITOR VARIOUS AIRGLOW AND AURORAL FEATURES WHICH LIE IN THE SPECTRAL RANGE BETWEEN 3000 A AND 7500 A. THE PRIMARY INFORMATION OBTAINED FROM THIS EXPERIMENT WAS THE RATES OF EXCITATION OF THE ATOMIC AND MOLECULAR CONSTITUENTS OF THE THERMOSPHERE. FOR THE AE-C MISSION, THE FOLLOWING SIX SPECIFIC LINES AND BANDS WERE CHOSEN FOR STUDY SINCE THEY PLAY AN IMPORTANT ROLE IN THE PHOTOCHEMICAL ENERGY BALANCE OF THE ATMOSPHERE -- 3371 A, 4278 A, 5205 A, 5977 A, 6300 A, AND 7319 TO 7330 A. TWO OPTICAL SYSTEMS VIEWED AT RIGHT ANGLES TO EACH OTHER. EACH ONE EMPLOYED A COMBINATION OF A SIMPLE OBJECTIVE LENS AND FIELD STOP TO DEFINE THE FIELD OF VIEW. EACH CONTAINED A MULTISTAGE LIGHT RAFFLE. THE WIDE-ANGLE HIGH SENSITIVITY SYSTEM (DESIGNATED CHANNEL 2) HAD A FIELD OF VIEW OF 3 DEG HALF-ANGLE, AND WAS USED TO MEASURE THE NIGHTGLOW, DAYGLOW ABOVE THE SATELLITE, AND OTHER WEAK EMISSION FEATURES. THE LESS SENSITIVE SYSTEM (DESIGNATED CHANNEL 1) HAD A FIELD OF VIEW OF APPROXIMATELY 3/4 DEG HALF-ANGLE, AND WAS USED FOR DAYGLOW AND NIGHTGLOW HORIZON MEASUREMENTS AS WELL AS DISCRETE AURORAL FEATURES WHICH SHOWED STRONG SPATIAL GRADIENTS. BOTH OPTICAL CHANNELS HAD A DIAMETER OF 2.2 CM. THEY SHARED A FILTER WHEEL THAT CONTAINED 6 INTERFERENCE FILTERS AT THE WAVELENGTHS IDENTIFIED ABOVE, AND TWO OTHER POSITIONS. ONE WAS A DARK POSITION FOR NOISE MEASUREMENTS, AND THE OTHER WAS A CALIBRATE POSITION. THE DYNAMIC RANGE OF THE INSTRUMENT WAS 10 TO THE 6 POWER RANGES. IN ORDER THAT THE SENSORS BE ABLE TO RESPOND IN A FRACTION OF A SECOND TO LARGE CHANGES IN SURFACE BRIGHTNESS WITHOUT ANY NOTICEABLE ENHANCEMENT IN THE BACKGROUND COUNT RATE, EACH ONE CONTAINED A 1/100 ATTENUATOR AND AN ELECTRONIC CIRCUIT TO BACK-BIAS THE CATHODE. WITH THESE PROTECTIVE FEATURES IT WAS POSSIBLE TO MEASURE A DARK FEATURE WITH NO APPARENT ENHANCEMENT IN BACKGROUND WITHIN 120 MSEC AFTER A DIRECT VIEW OF THE SUN. PHOTONS REACHING THE CATHODE

WERE RECORDED USING A PULSE-COUNTING SYSTEM. THE INTEGRATION TIME WAS 33 MSEC FOR CHANNEL 1 AND 132 MSEC FOR CHANNEL 2. PRIMARY COMMAND AND TELEMETRY FORMATTING SYSTEMS WERE SHARED BY THE TWO CHANNELS. THE EXPERIMENT COULD BE COMMANDED INTO ANY ONE OF SEVERAL OPERATING MODES DEPENDING ON THE SCIENCE REQUIREMENTS AND SPACECRAFT ATTITUDE. FOR MORE EXPERIMENT DETAILS, SEE "THE VISIBL-AIRGLOW EXPERIMENT ON ATMOSPHERE EXPLORER," P. D. HAYS, ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP. 369 (1973).

----- AE-C, HEATH -----

EXPERIMENT NAME- SOLAR EUV FILTER PHOTOMETER

NSDOC ID- 73-101A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.F. HEATHNASA-GSFC
GREENBELT, MD
OI - J. OSANTOWSKINASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERE EXPLORER C SOLAR EUV FILTER PHOTOMETER EXPERIMENT HAD TWO PRIMARY OBJECTIVES -- (1) TO MONITOR SOLAR EUV FLUX IN SIX WAVELENGTH INTERVALS FROM 40 TO 1100 A AND (2) TO MEASURE THE BROADBAND ATMOSPHERIC ABSORPTION AS A FUNCTION OF ALTITUDE TO DETERMINE EFFECTIVE IONIZATION RATES FOR MOLECULAR NITROGEN AND ATOMIC OXYGEN. SECONDARY OBJECTIVES WERE TO PROVIDE COVERAGE OF TEMPORAL SOLAR EUV VARIATIONS FOR THE SELECTED GRATING SPECTROMETER EXPERIMENT AND TO PROVIDE A CHECK OF THE LONG-TERM STABILITY OF THE EUV SPECTROMETER. THE INSTRUMENT WAS COMPOSED OF FOUR BENDIX SPIRAL ELECTION MULTIPLIERS, THREE PHOTODIODES, AND A STEPPED EIGHT-POSITION FILTER WHEEL THAT CONTAINED SIX UNBACKED METALLIC FILTERS THAT WERE TRANSPARENT IN THE VICINITY OF THE PLASMA FREQUENCY. THE FILTER PHOTOMETER HAD A TRANSPARENT POSITION, A CALIBRATION POSITION, AND AN OPAQUE POSITION. SINCE EACH OF THE FILTERS WAS WED TO EACH OF THE DETECTORS, THIS CONFIGURATION PROVIDED AN INFLIGHT RELATIVE CALIBRATION OF ALL THE DETECTORS. THE EXPERIMENT WAS RIGIDLY MOUNTED ON THE +Z AXIS. THE TILT ANGLE WAS OPTIMIZED, DEPENDING ON THE SELECTED SPACECRAFT ORBITAL PARAMETERS, FOR MAXIMUM SUN VIEWING TIME FOR BOTH THE SPINNING AND THE EARTH-ORIENTED SPACECRAFT OPERATING MODES. ADEQUATE TEMPORAL COVERAGE OF THE SUN WAS PROVIDED BY THE LARGE INSTRUMENT FIELD OF VIEW (PLUS OR MINUS 30 DEG).

----- AE-C, HINTEREGGER -----

EXPERIMENT NAME- SOLAR EUV SPECTROPHOTOMETER

NSDOC ID- 73-101A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.E. HINTEREGGERUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - D.E. BEDDUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - L.A. HALLUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - C.W. CHAGNONUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - J.E. MANSONUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

SIX GRAZING-INCIDENCE GRATING MONOCHROMATORS, WHICH COMPRISED THE EUV SPECTROPHOTOMETER, PROVIDED MEASUREMENTS OF THE SOLAR EUV FLUX IN THE 170- TO 1700-A RANGE. THIS INSTRUMENT HAD MODERATE SPECTRAL RESOLUTION (2 A AT 300 A) AND WAS CAPABLE OF SCANNING THE ENTIRE RANGE OR SELECTING SIX NARROW BANDS FOR CONTINUOUS HIGH TIME RESOLUTION MONITORING. THE INSTRUMENT, WHICH WAS POINTED TOWARDS THE SUN WITH AN ACCURACY OF 2 ARC-MIN, PROVIDED DATA REFLECTING THE SOLAR INPUT AND DATA INDICATING ATMOSPHERIC ATTENUATION.

----- AE-C, HOFFMAN -----

EXPERIMENT NAME- MAGNETIC ION-MASS SPECTROMETER

NSDOC ID- 73-101A-10

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. HOFFMANU OF TEXAS, DALLAS
DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

A MAGNETIC ION MASS SPECTROMETER WAS FLOWN TO MEASURE IN SITU THE CONCENTRATIONS OF THE AMBIENT ION SPECIES IN THE MASS RANGE FROM 1 TO 90 ATOMIC MASS UNITS (AMU). MOUNTED ON THE SATELLITE EQUATOR NORMAL TO THE SPIN AXIS, THE ENTRANCE APERTURE FACED FORWARD WHEN THE SPACECRAFT WAS IN THE DESPIN MODE. THE ELECTRIC AND MAGNETIC FIELDS WERE ARRANGED TO PRODUCE A MASS SPECTRUM ALONG THE FOCAL PLANE FOLLOWING THE MAGNETIC ANALYZER. THREE SLITS WERE PLACED ALONG THE FOCAL

PLANE IN APPROPRIATE PLACES TO SIMULTANEOUSLY COLLECT IONS IN THE MASS RATIOS 1 TO 4 TO 16 AMU. IONOSPHERIC IONS WERE ACCELERATED INTO THE ANALYZER SYSTEM BY A NEGATIVE VOLTAGE THAT WILL VARY FROM -1000 TO -225 V. THE THREE MASS RANGES MEASURED SIMULTANEOUSLY WERE 1 TO 4, 4 TO 16, AND 16 TO 64 AMU. FOLLOWING EACH SLIT WAS AN ELECTRON MULTIPLIER AND A LOGARITHMIC ELECTROMETER-AMPLIFIER DETECTOR. THE DETECTOR OUTPUT COULD BE MEASURED DIRECTLY FOR AN ANALOG OUTPUT, OR IT COULD BE FED TO A 'PEAK' CIRCUIT THAT DETERMINED THE AMPLITUDE OF EACH PEAK IN THE SPECTRUM. ONLY THE AMPLITUDE OF EACH PEAK WAS TELEMETERED IN THE PRIMARY PEAKS MODE, AND IN THIS MODE THE TIME REQUIRED TO SIMULTANEOUSLY SWEEP ALL THREE MASS RANGES WAS 1 SEC. OTHER MODES OF OPERATION WERE POSSIBLE. IN THE ANALOG SHORT MODE, THE THREE MASS RANGES WERE SWEEPED IN 3 SEC, ALTERNATING WITH 1-SEC 'PEAKS' MODE SCANS. AN 8-SEC SWEEP TIME WAS REQUIRED IN THE ANALOG LONG MODE, AGAIN ALTERNATING WITH 1-SEC PEAKS MODE SCAN. AN OPTION EXISTED IN THE LOCKED MODE TO CONTINUOUSLY MEASURE ANY SET OF MASS NUMBERS IN THE RATIO 1 TO 4 TO 16 TO GIVE HIGH SPATIAL RESOLUTION. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE MAGNETIC ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER,' J. H. HOFFMAN, ET AL., 'RADIO SCIENCE', VOL. 8, NO. 4, PP. 315-322, (APRIL 1973).

----- AE-C, HOFFMAN -----

EXPERIMENT NAME- LOW-ENERGY ELECTRONS

NSDCC ID- 73-101A-12

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.A. HOFFMANNASA-GSFC

GREENBELT, MD

OI - D.S. EVANSNDAF-ERL

BOULDER, CO

OI - J.L. BURCHNASA-MSFC

HUNTSVILLE, AL

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WERE TO STUDY (1) THE ENERGY INPUT TO THE THERMOSPHERE, (2) THE CHARACTERISTICS OF FIELD-ALIGNED CURRENTS IN THE TRANS-AURORAL ZONE, AND (3) THE MAGNETOSPHERIC SUBSTORM PRECIPITATION. THE INSTRUMENT, WHICH MEASURED ELECTRONS IN THE ENERGY RANGE 0.2 TO 25 KEV, CONSISTED OF DETECTORS, EACH CONSISTING OF AN ELECTROSTATIC ANALYZER AND A CHANNEL ELECTRON MULTIPLIER. THERE WERE TWO MODES OF OPERATION, THE MONITOR MODE AND THE DATA MODE. IN THE MONITOR MODE, THERE WERE GOOD ENERGY RESOLUTION, MODERATE TEMPORAL RESOLUTION, AND REDUCED PITCH ANGLE MEASUREMENTS. THE DATA ACQUISITION IN THIS MODE WAS SIMULTANEOUS WITH THE PRIMARY AERONOMICAL AND IONOSPHERIC EXPERIMENTS WHEN THE SATELLITE WAS EITHER IN THE SPINNING OR DESPIN MODES. THE DATA MODE PROVIDED SUFFICIENT ENERGY, PITCH ANGLE, AND TEMPORAL RESOLUTION TO COMPLETELY CHARACTERIZE THE ELECTRON RADIATION ENCOUNTERED IN THE AURORAL AND TRANS-AURORAL REGIONS. DATA ACQUISITION OCCURRED ON A LOW-DUTY CYCLE DURING TIMES WHEN THE HEAVY EXPERIMENT POWER LOAD WAS OFF, ESPECIALLY IN THE DESPIN MODE TO ALLOW MEASUREMENT OF THE PITCH ANGLE. DURING SOME APOGEE PERIODS IN THE DESPIN MODE THE DETECTORS LOOKED DOWN TOWARD THE EARTH ALONG FIELD LINES.

----- AE-C, NIER -----

EXPERIMENT NAME- OPEN SOURCE NEUTRAL MASS SPECTROMETER

NSDCC ID- 73-101A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.D.C. NIERU OF MINN SOTA

MINNEAPOLIS, MN

OI - F.J. HEYDENMANILA OBS

THE PHILIPPINES

OI - K. MAUERSBERGERU OF MINN SOTA

MINNEAPOLIS, MN

OI - W.E. POTTERU OF MINN SOTA

MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WAS TO CONTRIBUTE TO A STUDY OF THE CHEMICAL, DYNAMIC, AND ENERGETIC PROCESSES THAT CONTROL THE STRUCTURE OF THE THERMOSPHERE, BY PROVIDING DIRECT IN SITU MEASUREMENTS OF CONCENTRATIONS OF BOTH THE MAJOR AND MINOR NEUTRAL ATMOSPHERIC CONSTITUENTS HAVING MASSES IN THE RANGE FROM 1 TO 40 ATOMIC MASS UNITS (AMU). A DOUBLE-FOCUSING HATTAUCH-HERZOG MAGNETIC DEFLECTION MASS SPECTROMETER WITH AN IMPACT ION SOURCE WAS USED. TWO ION COLLECTORS WERE INCLUDED TO MEASURE IONS DIFFERING IN MASS BY A FACTOR OF EIGHT, I.E., THE TWO MASS RANGES COVERED WILL BE 1 TO 8 AMU AND 7 TO 40 AMU. AN OPEN ION SOURCE WAS USED TO MINIMIZE THE LOSS OF REACTIVE SPECIES SUCH AS ATOMIC OXYGEN. NORMALLY, A 100-MICROAMP BEAM OF 75-EV ELECTRONS WAS USED FOR PRODUCING THE IONS. IN VIEW OF THE OVERALL GEOMETRY OF THIS INSTRUMENT, FOR MOLECULAR NITROGEN GAS, APPROXIMATELY 10 TO THE -5 AMP OF RESOLVED MASS -20 IONS APPEARED AT THE COLLECTOR WHEN THE PRESSURE IN THE SOURCE WAS EQUAL TO 1 TORR (1.33 MD). ON COMMAND, THE ELECTRON ACCELERATING VOLTAGE WAS REDUCED TO 25 EV. ELECTRON MULTIPLIERS IN THE COUNTING MODE WERE USED AS DETECTORS FOR BOTH HIGH- AND LOW-MASS ION COLLECTORS. A 50

PERCENT TRANSMISSION GRID, MOUNTED BETWEEN THE HIGH-MASS COLLECTOR SLIT AND ITS MULTIPLIER DETECTOR, INTERCEPTED HALF THE BEAM. THIS GRID WAS CONNECTED TO AN ELECTROMETER AMPLIFIER, AND THEREFORE, THE DYNAMIC RANGE OF THE MEASUREMENTS WAS EXTENDED BY ALLOWING SENSIBLE READOUTS AT ION CURRENT MAGNITUDES TOO LARGE FOR THE ELECTRON MULTIPLIER OPERATION. PLANNED OVERLAP IN THE RANGES OF THE TWO MEASURING TECHNIQUES PERMITTED A CHECK OF THE GAIN CHARACTERISTICS OF THE MULTIPLIER TO BE MADE. SEVERAL MEASUREMENT MODES WERE POSSIBLE AND WERE SELECTED BY GROUND COMMAND. USUALLY THE MASS SPECTROMETER WAS STEPPED FROM ONE MASS OF INTEREST TO ANOTHER UNDER THE CONTROL OF A 32-STEP READ-ONLY MEMORY DEVICE. THERE WERE EIGHT OF THESE 32-STEP PROGRAMS WHICH FELL INTO THE FOLLOWING FOUR CATEGORIES -- (1) NORMAL PROGRAMS THAT CONCENTRATE ON THE PEAKS OF GREATEST ABUNDANCES, SUCH AS MOLECULAR AND ATOMIC OXYGEN, MOLECULAR NITROGEN, HELIUM, AND ARGON; (2) MINOR CONSTITUENT PROGRAMS THAT OBTAIN MEASUREMENTS OF THE DOMINANT SPECIES TO PERMIT THE ELECTRON MULTIPLIER TO OPERATE AT LOWER ALTITUDES THAN OTHERWISE POSSIBLE; (3) A LOW MASS PROGRAM THAT CONCENTRATES ON MASSES FROM 1 TO 5 AMU; AND (4) A NITROGEN OXIDE PROGRAM THAT MEASURES THIS MASS -30 CONSTITUENT NEARLY CONTINUOUSLY. IN ADDITION, AN OPTION WAS AVAILABLE TO COMMAND THE SPECTROMETER TO SCAN THE MASS RANGE IN 0.25-AMU STEPS. THE RANGE OF OPERATION FOR THE ELECTROMETER WAS APPROXIMATELY 2.5 BY 10 TO THE -14 TO 4.0 BY 10 TO THE -9 AMP AND FOR THE MULTIPLIER THE UPPER LIMIT WAS 3 BY 10 TO THE -6 COUNTS/SEC. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE OPEN SOURCE NEUTRAL MASS SPECTROMETER ON ATMOSPHERE EXPLORER-C, -D, AND -E,' A. D. NIER ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP. 271 (1973).

----- AE-C, RICE -----

EXPERIMENT NAME- COLD CATHODE ION GAUGE

NSDCC ID- 73-101A-15

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.J. RICEAEROSPACE CORP

EL SEGUNDO, CA

OI - V.L. CARTERAEROSPACE CORP

EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THE COLD CATHODE ION GAUGE FLOWN ON AE-C WAS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATION. HOWEVER, DATA FROM THIS EXPERIMENT WAS CORRELATED WITH ACCELEROMETER AND CAPACITANCE MANOMETER DATA TO EVALUATE SATELLITE DRAG PERFORMANCE. THE ION GAUGE, ALSO REFERRED TO AS PRESSURE SENSOR A (PSA), MEASURED ATMOSPHERIC PRESSURE IN THE REGION BETWEEN 120 AND 370 KM ABOVE THE EARTH'S SURFACE FOR VALUES OF ATMOSPHERIC PRESSURE BETWEEN 1.3 E-3 TO 1.3 E-7 MD. THE ESTIMATED ACCURACY OF THE PSA WAS PLUS OR MINUS 20 PERCENT. THE CYLINDRICALLY SHAPED SENSOR PACKAGE CONSISTED OF A WEDGE-SHAPED ORIFICE, A CATHODE NEAR GROUND POTENTIAL, AN ANODE OPERATING AT ABOUT 1300 VDC, AND A PERMANENT MAGNETIC FIELD OF ABOUT 1600 GAUSS. THE GAUGE CONTAINED NO PRIMARY SOURCE OF IONIZING ELECTRONS. THE DISCHARGE WAS INITIATED BY FIELD EMISSION AND WAS SELF-SUSTAINING AT A PRESSURE ABOVE 1.3 E-7 MD. THE ION CURRENT WAS COLLECTED AT THE CATHODE. THE SENSOR WAS MOUNTED ON THE SPACECRAFT. WITH THE ORIFICE PERPENDICULAR TO THE SPACECRAFT SPIN-AXIS WHICH WAS NORMAL TO THE ORBITAL PLANE, THE INSTRUMENT COULD BE OPERATED IN TWO MODES, SPINNING OR DESPIN. WHEN THE SPACECRAFT WAS IN A SPINNING MODE, THE PSA ALTERNATELY SAMPLED THE RAM AND WAKE PRESSURE. WHEN THE SPACECRAFT WAS IN THE DESPIN MODE, THE PSA FACED 30 DEG FROM THE DIRECTION OF MOTION. DATA FROM THIS EXPERIMENT WAS NOT TAPE RECORDED, BUT WAS OBSERVED IN REAL TIME.

----- AE-C, RICE -----

EXPERIMENT NAME- CAPACITANCE MANOMETER

NSDCC ID- 73-101A-16

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/16/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.J. RICEAEROSPACE CORP

EL SEGUNDO, CA

OI - V.L. CARTERAEROSPACE CORP

EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THE CAPACITANCE MANOMETER TO BE FLOWN ON AE-C WAS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATIONS. HOWEVER, DATA FROM THIS EXPERIMENT WERE ALSO CORRELATED WITH ACCELEROMETER AND ION GAUGE DATA IN EVALUATING SATELLITE DRAG. THE MANOMETER, ALSO REFERRED TO AS PRESSURE SENSOR B (PSB), MEASURED ATMOSPHERIC PRESSURE IN THE REGION BELOW 200 KM. THE ACCURACY OF THE PSB GAUGE VARIED FROM ABOUT 10 PERCENT AT 120 KM TO ABOUT 40 PERCENT AT 100 KM. THE PSB CONSISTED OF TWO SPHERICAL, THERMALLY CONTROLLED CHAMBERS, SEPARATED BY A THIN MEMBRANE STRETCHED FLAT AND UNDER RADIAL TENSION. ANY DEFLECTION OF THE DIAPHRAGM CAUSED BY A PRESSURE DIFFERENTIAL BETWEEN THE TWO SIDES CAUSED A CHANGE IN CAPACITANCE BETWEEN THE DIAPHRAGM AND AN ADJACENT ELECTRODE WHICH IS MEASURED BY AN AC BRIDGE CIRCUIT. AIR WAS PERMITTED INTO ONE OF THE CHAMBERS THROUGH TWO PORTS 180 DEG APART AND

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BE DERIVED. THIS PROBE WILL CONSIST OF A COLLECTOR ELECTRODE EXTENDING ALONG THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING WILL EXTEND 23 CM FROM THE SPACECRAFT, AND THE ELECTRODE WILL EXTEND ANOTHER 10 CM FURTHER FROM THE END OF THE GUARD RING. TWO IDENTICAL PROBES WILL BE MOUNTED PARALLEL TO THE SPACECRAFT SPIN AXIS (SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE), AND A THIRD PROBE WILL BE MOUNTED PERPENDICULAR TO THE SPIN AXIS. IN ADDITION TO ONBOARD ANALYSES OF THE RETARDING POTENTIAL CURVES, WHICH PROVIDE TEMPERATURES AND DENSITIES, THESE CURVES WILL BE TELEMETERED.

----- AE-D, CHAMPION -----

EXPERIMENT NAME- ATMOSPHERIC DRAG

NSDOC ID- AE-D -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.S.W. CHAMPIONUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - F.A. MARCOSUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERIC DENSITY ACCELEROMETER EXPERIMENT WILL OBTAIN DATA ON THE NEUTRAL DENSITY OF THE ATMOSPHERE IN THE ALTITUDE RANGE 120 TO 400 KM BY THE MEASUREMENT OF SATELLITE DECELERATION DUE TO AERODYNAMIC DRAG. THE EXPERIMENT WILL CONSIST OF THREE SINGLE-AXIS ACCELEROMETERS. TWO OF THE UNITS WILL LIE IN THE SPACECRAFT X-Y PLANE, AND THE THIRD WILL BE ALIGNED WITH THE Z AXIS. EACH INSTRUMENT WILL MEASURE THE ELECTROSTATIC FORCE REQUIRED TO RESTRAIN A HOLLOW CYLINDRICAL MASS UNDER EXTERNAL ACCELERATION. THE DYNAMIC RANGE OF EACH UNIT WILL BE 10 TO THE -6 TO 10 TO THE -12 GRAMS.

----- AE-D, DDERING -----

EXPERIMENT NAME- PHOTOELECTRON SPECTROMETER

NSDOC ID- AE-D -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.P. DDERINGJOHNS HOPKINS U
BALTIMORE, MD
OI - C.O. BOSTROMAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - J.C. ARMSTRONGAPPLIED PHYSICS LAB
SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE INTENSITY AND ENERGY DISTRIBUTION OF THE PHOTOELECTRON FLUX IN THE THERMOSPHERE IN THE RANGE 2 TO 500 EV. THE INSTRUMENTATION WILL CONSIST OF TWO OPPOSITELY DIRECTED HEMISPHERICAL-ELECTROSTATIC DEFLECTORS COUPLED TO SEPARATE ELECTRON MULTIPLIER DETECTORS. THE PHOTOELECTRON ENERGY SPECTRUM WILL BE SCANNED BY 1-SEC SWEEPS OF THE VOLTAGE BETWEEN THE TWO HEMISPHERICAL DEFLECTION ELEMENTS OF EACH DEFLECTOR.

----- AE-D, HANSON -----

EXPERIMENT NAME- ION TEMPERATURE

NSDOC ID- AE-D -04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.B. HANSONU OF TEXAS, DALLAS
DALLAS, TX
OI - D.R. ZUCCARDU OF TEXAS, DALLAS
DALLAS, TX
OI - S. SANTINIU OF TEXAS, DALLAS
DALLAS, TX
OI - C.R. LIPPENCOTTU OF TEXAS, DALLAS
DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

THE PLANAR ION TRAP, A RETARDING POTENTIAL TYPE OF INSTRUMENT, WILL MEASURE CURRENT FLOWING TO A COLLECTOR FOR A KNOWN LINEAR VOLTAGE SWEEP TO BE APPLIED TO THE COLLECTOR. THE ION TEMPERATURE, ION DENSITY, COMPOSITION, SUPRATHERMAL ELECTRON FLUXES, AND SUPRATHERMAL ELECTRON TEMPERATURES WILL BE DETERMINED FROM THIS RETARDING POTENTIAL CURVE AND FROM KNOWLEDGE OF THE VOLTAGE ON SUPPRESSOR GRIDS BETWEEN THE INSTRUMENT APERTURE AND THE COLLECTOR. THE EXPERIMENT WILL OPERATE IN ONE MODE WHILE THE SPACECRAFT IS SPINNING AND IN A SECOND MODE WHEN THE SPACECRAFT IS NOT SPINNING. A COMPLETE VOLTAGE SWEEP (BOTH DOWN AND UP -- +23 TO 0 TO +23 V) COULD BE ACCOMPLISHED IN THREE SEC IN THE NONSPINNING MODE. AN ADDITIONAL 3-SEC 'DUCT' MODE WILL OPERATE TO PROVIDE MEASUREMENTS FROM WHICH FRACTIONAL ION CONCENTRATION CHANGES AS SMALL AS 0.001 IONS/CC PER 130 M ALONG TRACK TRAVEL COULD BE MADE.

----- AE-D, HAYS -----

EXPERIMENT NAME- AIRGLOW PHOTOMETER

NSDOC ID- AE-D -13

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P.D. HAYSU OF MICHIGAN
ANN ARBOR, MI
OI - G.G. SHEPHERDYORK U
TORONTO, ONTARIO, CANADA
OI - G.R. CARIGNANU OF MICHIGAN
ANN ARBOR, MI
OI - J.C.G. WALKERYALE U
NEW HAVEN, CT

EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE AIRGLOW EXPERIMENT WILL PROVIDE VOLUME EMISSION RATES FOR SEVERAL DAYGLOW, NIGHTGLOW, AND AURORAL OPTICAL EMISSION FEATURES. A PHOTOMETER CONTAINING TWO SEPARATE OPTICAL CHANNELS WILL BE USED. SPECTRAL SELECTION WILL BE ACCOMPLISHED WITH A COMMON FILTER WHEEL THAT WILL CONTAIN SIX INTERFERENCE FILTERS AND A DARK AND CALIBRATE POSITION. ANY ONE OF EIGHT POSSIBLE COMBINATIONS OF FILTERS CAN BE SELECTED FOR THE TWO CHANNELS THAT ARE SEPARATED IN ANGLE BY 90 DEG. ONE CHANNEL WILL HAVE A LARGE FIELD OF VIEW (3 DEG HALF-ANGLE) FOR HIGH SENSITIVITY. NORMALLY POINTING TOWARD THE LOCAL ZENITH, AND THE SECOND CHANNEL WILL HAVE A SMALL FIELD OF VIEW (0.75 DEG HALF-ANGLE) FOR HIGH SPATIAL RESOLUTION. POINTING TANGENT TO THE SURFACE OF THE EARTH WHEN THE SATELLITE IS IN THE DESPUN MODE, BOTH CHANNELS WILL BE PROTECTED FROM STRAY LIGHT CONTAMINATION DURING DAYTIME BY MULTISTAGE BAFFLE SYSTEMS. PHOTONS THAT HAVE BEEN SPECTRALLY AND SPATIALLY SELECTED WILL BE SENSED BY A PULSE-COUNTING PHOTOMULTIPLIER SYSTEM CAPABLE OF COUNTING AT A RATE OF 5 TIMES 10 TO THE 6 COUNTS/SEC. THE FILTERS CAN BE OPERATED IN SEVERAL MODES, E.G., FIXED FILTER AND AUTOMATIC FILTER CHANGES CAN BE SYNCHRONIZED EITHER TO SATELLITE ORIENTATION OR TO A FIXED-TIME BASE. BASIC DATA ANALYSIS WILL YIELD VOLUME EMISSION RATE ALONG THE SATELLITE TRACK, AND THE NARROW CHANNEL WILL PROVIDE DATA TO OBTAIN VOLUME EMISSION RATES VS ALTITUDE THROUGHOUT THE ENTIRE PERIGEE REGION. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE VISIBLE-AIRGLOW EXPERIMENT ON ATMOSPHERIC EXPLORER,' P. J. HAYS, ET. AL., 'RADIO SCIENCE,' VOL. 3, NO. 4, PP. 369 (1973).

----- AE-D, HINTEREGGER -----

EXPERIMENT NAME- SOLAR EUV SPECTROPHOTOMETER

NSDOC ID- AE-D -06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.E. HINTEREGGERUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - D.E. BEEDUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - L.A. HALLUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - C.W. CHAGNONUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - J.E. MANSONUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

SIX GRAZING-INCIDENCE GRATING MONOCHROMATORS, WHICH WILL COMPRISE THE EUV SPECTROPHOTOMETER, WILL PROVIDE MEASUREMENTS OF THE SOLAR EUV FLUX IN THE 170- TO 1700-A RANGE. THIS INSTRUMENT WILL HAVE MODERATE SPECTRAL RESOLUTION (2 A AT 300 A) AND WILL BE CAPABLE OF SCANNING THE ENTIRE RANGE OR SELECTING SIX NARROW BANDS FOR CONTINUOUS HIGH TIME RESOLUTION MONITORING. THE INSTRUMENT, WHICH WILL BE POINTED TOWARDS THE SUN WITH AN ACCURACY OF 2 ARC-MIN, WILL PROVIDE DATA REFLECTING THE SOLAR INPUT AND DATA INDICATING ATMOSPHERIC ATTENUATION.

----- AE-D, HOFFMAN -----

EXPERIMENT NAME- ION COMPOSITION AND CONCENTRATION

NSDOC ID- AE-D -10

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. HOFFMANU OF TEXAS, DALLAS
DALLAS, TX
OI - E.E. FERGUSONNOAA-NMC
SUITLAND, MD
OI - W.B. HANSONU OF TEXAS, DALLAS
DALLAS, TX
OI - C.R. LIPPENCOTTU OF TEXAS, DALLAS
DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

A MAGNETIC ION MASS SPECTROMETER WILL BE FLOWN TO MEASURE IN SITU THE CONCENTRATIONS OF THE AMBIENT ION SPECIES

IN THE MASS RANGE FROM 1 TO 90 ATOMIC MASS UNITS (AMU), MOUNTED ON THE SATELLITE EQUATOR NORMAL TO THE SPIN AXIS, THE ENTRANCE APERTURE WILL FACE FORWARD WHEN THE SPACECRAFT IS IN THE DESPIN MODE. THE ELECTRIC AND MAGNETIC FIELDS WILL BE ARRANGED TO PRODUCE A MASS SPECTRUM ALONG THE FOCAL PLANE FOLLOWING THE MAGNETIC ANALYZER. THREE SLITS WILL BE PLACED ALONG THE FOCAL PLANE IN APPROPRIATE PLACES TO SIMULTANEOUSLY COLLECT IONS IN THE MASS RATIOS 1-4-16 AMU. IONOSPHERIC IONS WILL BE ACCELERATED INTO THE ANALYZER SYSTEM BY A NEGATIVE VOLTAGE THAT WILL VARY FROM -1060 TO -225 V. THE THREE MASS RANGES MEASURED SIMULTANEOUSLY WILL BE 1 TO 4, 4 TO 16, AND 16 TO 64 AMU. FOLLOWING EACH SLIT WILL BE AN ELECTRON MULTIPLIER AND A LOGARITHMIC ELECTROMETER-AMPLIFIER DETECTOR. THE DETECTOR OUTPUT COULD BE MEASURED DIRECTLY FOR AN ANALOG OUTPUT, OR IT COULD BE FED TO A 'PEAK' CIRCUIT THAT WILL DETERMINE THE AMPLITUDE OF EACH PEAK IN THE SPECTRUM. ONLY THE AMPLITUDE OF EACH PEAK WILL BE TELEMETERED IN THE PRIMARY PEAKS MODE, AND IN THIS MODE THE TIME REQUIRED TO SIMULTANEOUSLY SWEEP ALL THREE MASS RANGES WILL BE 1 SEC. OTHER MODES OF OPERATION WILL BE POSSIBLE. IN THE ANALOG SHORT MODE, THE THREE MASS RANGES WILL BE SWEEP IN 3 SEC. ALTERNATING WITH 1-SEC 'PEAKS' MODE SCANS. AN 8-SEC SWEEP TIME WILL BE REQUIRED IN THE ANALOG LONG MODE, AGAIN ALTERNATING WITH 1-SEC PEAKS MODE SCANS. AN OPTION WILL EXIST IN THE LOCKED MODE TO CONTINUOUSLY MEASURE ANY SET OF MASS NUMBERS IN THE RATIO 1-4-16 TO GIVE HIGH SPATIAL RESOLUTION. THIS MODE, WHICH WILL ALSO INCLUDE AN OCCASIONAL 1-SEC SWEEP OF THE MASS SPECTRUM IN THE PEAKS MODE, WILL BE MOST USEFUL IN THE DESPIN SATELLITE ORIENTATION. MORE EXPERIMENT DETAIL CAN BE FOUND IN 'THE MAGNETIC ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER,' J. H. HOFFMAN, ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP.315-322, (APRIL 1973).

----- AE-D, HOFFMAN -----

EXPERIMENT NAME- LOW-ENERGY ELECTRONS

NSSDC ID- AE-D -12

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.A. HOFFMANNASA-GSFC
GREENBELT, MD
OI - D.S. EVANSNDA-EP
BOULDER, CO
OI - J.L. BURCHNASA-MSFC
HUNTSVILLE, AL

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WILL BE TO STUDY (1) THE ENERGY INPUT TO THE THERMOSPHERE FROM ELECTRONS IN THE ENERGY RANGE 0.2 TO 25 KEV, (2) THE CHARACTERISTICS OF FIELD-ALIGNED CURRENTS IN THE TRANS-AURORAL ZONE, AND (3) THE MAGNETOSPHERIC SURSTORM PRECIPITATION. THE INSTRUMENT WILL CONSIST OF 19 DETECTORS, EACH CONSISTING OF AN ELECTROSTATIC ANALYZER AND A CHANNEL ELECTRON MULTIPLIER. THERE WILL BE TWO MODES OF OPERATION, THE MONITOR MODE AND THE DATA MODE. IN THE MONITOR MODE, THERE WILL BE GOOD ENERGY RESOLUTION, MODERATE TEMPORAL RESOLUTION, AND REDUCED PITCH ANGLE MEASUREMENTS. THE DATA ACQUISITION WILL BE SIMULTANEOUS WITH THE PRIMARY AERONAUTICAL AND IONOSPHERIC EXPERIMENTS WHEN THE SATELLITE IS EITHER IN THE SPINNING OR DESPIN MODES. THE DATA MODE WILL PROVIDE SUFFICIENT ENERGY, PITCH ANGLE, AND TEMPORAL RESOLUTION TO COMPLETELY CHARACTERIZE THE ELECTRON RADIATION ENCOUNTERED IN THE AURORAL AND TRANS-AURORAL REGIONS. DATA ACQUISITION WILL OCCUR ON A LOW-DUTY CYCLE DURING TIMES WHEN THE HEAVY EXPERIMENT POWER LOAD IS OFF, ESPECIALLY IN THE DESPIN MODE TO ALLOW MEASUREMENT OF THE PITCH ANGLE. DURING SOME APOGEE PERIODS IN THE DESPIN MODE, THE DETECTORS WILL LOOK TOWARD THE EARTH ALONG FIELD LINES.

----- AE-D, NIER -----

EXPERIMENT NAME- OPEN SOURCE NEUTRAL MASS SPECTROMETER

NSSDC ID- AE-D -07

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.D.C. NIERU OF MINNESOTA
MINNEAPOLIS, MN
OI - W.E. POTTERU OF MINNESOTA
MINNEAPOLIS, MN
OI - K. MAUERSBERGERU OF MINNESOTA
MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO CONTRIBUTE TO A STUDY OF THE CHEMICAL, DYNAMIC, AND ENERGETIC PROCESSES THAT CONTROL THE STRUCTURE OF THE THERMOSPHERE, BY PROVIDING DIRECT IN SITU MEASUREMENTS OF CONCENTRATIONS OF BOTH THE MAJOR AND MINOR NEUTRAL ATMOSPHERIC CONSTITUENTS HAVING MASSES IN THE RANGE FROM 1 TO 40 ATOMIC MASS UNITS (AMU). A DOUBLE-FOCUSING MATTAUCH-HERZOG MAGNETIC DEFLECTION MASS SPECTROMETER WITH AN IMPACT ION SOURCE WILL BE USED. TWO ION COLLECTORS WILL BE INCLUDED TO MEASURE IONS DIFFERING IN MASS BY A FACTOR OF EIGHT, I.E., THE TWO MASS RANGES COVERED WILL BE 1 TO 8 AMU AND 7 TO 40 AMU. AN OPEN ION SOURCE WILL BE USED TO MINIMIZE THE LOSS OF REACTIVE SPECIES SUCH AS ATOMIC OXYGEN. NORMALLY, A 100-MICROAMP BEAM OF 75-EV ELECTRONS WILL

BE USED FOR PRODUCING THE IONS. IN VIEW OF THE OVERALL GEOMETRY OF THIS INSTRUMENT, FOR MOLECULAR NITROGEN GAS, APPROXIMATELY 10 TO THE -5 AMP OF RESOLVED MASS -20 IONS WILL APPEAR AT THE COLLECTOR WHEN THE PRESSURE IN THE SOURCE IS EQUAL TO 1 TORR (1.33 MD). ON COMMAND, THE ELECTRON ACCELERATING VOLTAGE CAN BE REDUCED TO 25 EV. AT THIS LOWER ENERGY, THERE SHOULD NOT BE ANY DISSOCIATION OF MOLECULAR NITROGEN, AND THEREFORE, IT WILL BE POSSIBLE TO MEASURE ATMOSPHERIC ATOMIC NITROGEN. ELECTRON MULTIPLIERS IN THE COUNTING MODE WILL BE USED AS DETECTORS FOR BOTH HIGH AND LOW-MASS ION COLLECTORS. A 50-PERCENT TRANSMISSION GRID, MOUNTED BETWEEN THE HIGH-MASS COLLECTOR SLIT AND ITS MULTIPLIER DETECTOR, WILL INTERCEPT HALF THE BEAM. THIS GRID WILL BE CONNECTED TO AN ELECTROMETER AMPLIFIER, AND THEREFORE, THE DYNAMIC RANGE OF THE MEASUREMENTS WILL BE EXTENDED BY ALLOWING SENSIBLE READOUTS AT ION CURRENT MAGNITUDES TOO LARGE FOR THE ELECTRON MULTIPLIER OPERATION. PLANNED OVERLAP IN THE RANGES OF THE TWO MEASURING TECHNIQUES WILL PERMIT A CHECK OF THE GAIN CHARACTERISTICS OF THE MULTIPLIER TO BE MADE. SEVERAL MEASUREMENT MODES WILL BE AVAILABLE AND WILL BE SELECTED BY GROUND COMMAND DURING FLIGHT. USUALLY THE MASS SPECTROMETER WILL BE STEPPED FROM ONE MASS OF INTEREST TO ANOTHER UNDER THE CONTROL OF A 32-STEP READ-ONLY MEMORY DEVICE. EIGHT OF THESE 32-STEP PROGRAMS FALL INTO THE FOLLOWING FOUR CATEGORIES -- (1) NORMAL PROGRAMS THAT CONCENTRATE ON THE PEAKS OF GREATEST ABUNDANCES, SUCH AS MOLECULAR AND ATOMIC OXYGEN, MOLECULAR NITROGEN, HELIUM, AND ARGON, (2) MINOR CONSTITUENT PROGRAMS THAT OBTAIN MEASUREMENTS OF THE DOMINANT SPECIES TO PERMIT THE ELECTRON MULTIPLIER TO OPERATE AT LOWER ALTITUDES THAN OTHERWISE POSSIBLE, (3) A LOW-MASS PROGRAM THAT CONCENTRATES ON MASSES FROM 1 TO 8 AMU, AND (4) A NITROGEN OXIDE PROGRAM THAT MEASURES THIS MASS -30 CONSTITUENT NEARLY CONTINUOUSLY. IN ADDITION, AN OPTION WILL BE AVAILABLE TO COMMAND THE SPECTROMETER TO SCAN THE MASS RANGE IN 0.25-AMU STEPS. ABUNDANT CONSTITUENTS WILL BE MEASURED APPROXIMATELY ONCE EACH HALF-SEC. CORRESPONDING TO A SPATIAL RESOLUTION OF ABOUT 6 KM ALONG THE SATELLITE TRACK. THE RANGE OF OPERATION FOR THE ELECTROMETER WILL BE APPROXIMATELY 2.5 BY 10 TO THE -14 TO 4.8 BY 10 TO THE -9 AMP, AND FOR THE MULTIPLIER THE UPPER LIMIT WILL BE 3 BY 10 TO THE -6 COUNTS/SEC. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE OPEN SOURCE NEUTRAL-MASS SPECTROMETER ON ATMOSPHERE EXPLORER-C,' D. AND 'E.' A. O. NIER ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP.271 (1973).

----- AE-D, PELZ -----

EXPERIMENT NAME- CLOSED SOURCE NEUTRAL MASS SPECTROMETER

NSSDC ID- AE-D -08

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.T. PELZNASA-GSFC
GREENBELT, MD
OI - C.A. REGERNASA-GSFC
GREENBELT, MD
OI - G.R. CARRIGANU OF MICHIGAN
ANN ARBOR, MI
OI - A.E. HEDINNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE IN SITU THE SPATIAL DISTRIBUTION AND TEMPORAL CHANGES OF THE CONCENTRATIONS OF THE NEUTRAL ATMOSPHERIC SPECIES. IN ADDITION, NEW INSIGHT INTO IN SITU MEASUREMENT TECHNIQUES MAY BE OBTAINED FROM COMPARISONS OF THESE MEASUREMENTS WITH THOSE OBTAINED FROM OTHER ONBOARD EXPERIMENTS, NAMELY -- OPEN SOURCE SPECTROMETER (AE-D -07), SOLAR EUV SPECTROPHOTOMETER (AE-D -06), AND DENSITY-ACCELEROMETER (AE-D -02). THE MASS-SPECTROMETER SENSOR WILL INCLUDE A GOLD-PLATED STAINLESS STEEL THERMALIZING CHAMBER AND ION SOURCE, A HYPERBOLIC ROD QUADRUPOLE ANALYZER, AND AN OFF-AXIS ELECTRON MULTIPLIER. APPROXIMATE UPPER ALTITUDE LIMITS OF MEASUREMENT, DETERMINED PRIMARILY BY GAS/SURFACE INTERACTIONS AND INSTRUMENT SENSITIVITY LIMITATIONS, WILL BE -- 250 KM FOR MOLECULAR OXYGEN, 300 KM FOR ARGON, 550 KM FOR MOLECULAR NITROGEN, 700 KM FOR ATOMIC OXYGEN, AND 1000 KM FOR HELIUM. FIVE DIFFERENT SEQUENCES OF MASS SELECTION WILL BE AVAILABLE AND, EXPRESSED IN ATOMIC MASS UNITS (AMU), WILL BE -- (A) GEOPHYSICAL - 1, 2, 4, TOTAL, 16, 20, 32, SELECTED, 40, (D) ANALYTICAL - 12, 14, 18, 20, 22, 30, 44, CALIBRATE, ZERO, (C) INDIVIDUAL - SELECTED, SELECTED, . . . (ANY MASS 1 TO 44), (I) SWEEP DIGITAL - 1, 2, 3, 4, 5, . . . 45 (IN 3/16-AMU STEPS), (E) SWEEP ANALOG 2, 3, 4, 5, 45 (CONTINUOUS). THE FIVE OPERATIONAL FORMATS USED CAN BE SELECTED BY GROUND COMMAND, AND EACH ONE WILL CONTAIN A DIFFERENT COMBINATION OF THE FIVE MASS SELECTION SEQUENCES LISTED ABOVE. WHEN OPERATING IN THE 'NORMAL' FORMAT, THE ANALYZER WILL MEASURE ALL MASSES IN THE RANGE 1 TO 44 WITH EMPHASIS ON HYDROGEN, HELIUM, OXYGEN, NITROGEN, AND ARGON. ANOTHER FORMAT WILL BE OPTIMIZED FOR MINOR CONSTITUENT STUDIES OF ANY INDIVIDUAL GAS SPECIES IN THE MEASURED RANGE. SPATIAL RESOLUTION IS DETERMINED PRIMARILY BY THE MODE OF SPACECRAFT OPERATION. WHEN THE SPACECRAFT IS SPINNING AT 4 RPM, MEASUREMENTS OF THE PRINCIPAL ATMOSPHERIC SPECIES WILL BE OBTAINED AT 12-KM INTERVALS (1.5 SEC) ALONG THE SATELLITE TRACK, WHILE THE INSTRUMENT IS PACING FORWARD. IN THE 'NORMAL' FORMAT, ALL MEASUREMENTS WILL BE MADE AT 12-KM INTERVALS WHEN THE SPACECRAFT IS DESPIN. IN ORBIT, THE PRESSEALED SPECTROMETER WILL BE OPENED, AND THE ATMOSPHERIC CONSTITUENTS WILL PASS THROUGH A KNIFE-EDGED ORIFICE INTO THE THERMALIZATION CHAMBER AND ION SOURCE. SELECTED IONS WILL LEAVE THE QUADRUPOLE

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

ANALYZER THROUGH A WEAK FOCUSING LENS AND WILL BE ACCELERATED INTO A 14-STAGE ELECTRON MULTIPLIER, WHERE THEY WILL BE TURNED 90 DEG TO STRIKE THE FIRST DYNODE. FOR EACH IMPACTING ION, THE MULTIPLIER OUTPUT WILL BE A PULSE OF 2 X 10 TO THE SIXTH POWER ELECTRONS. THESE OUTPUT PULSES WILL CONSTITUTE THE MEASUREMENT, AND THE COUNT RATE WILL BE PROPORTIONAL TO THE CHAMBER DENSITY OF THE SELECTED SPECIES. THESE DENSITY VALUES WILL THEN BE CONVERTED TO AMBIENT CONCENTRATIONS. THE ANALYZER WILL NORMALLY OPERATE AT A RESOLUTION OF 1 AMU OVER THE MASS RANGE, SO THAT A MASS PEAK ONE-THOUSANDTH THE AMPLITUDE OF AN ADJACENT PEAK CAN BE MEASURED. FOR THE DYNAMIC RANGE REQUIRED, PULSES OCCURRING DURING 0.015-SEC INTEGRATION INTERVALS WILL BE ACCUMULATED IN A 16-BIT COUNTER. MULTIPLE INTEGRATION PERIODS (UP TO 16) WILL BE ASSIGNED TO EACH MEASUREMENT FOR LESS DENSE ATMOSPHERIC SPECIES. AUTOMATICALLY SELECTED RANGES OF IONIZING ELECTRON CURRENTS WILL BE USED. THE OVERALL RANGE OF THE MEASUREMENTS WILL BE GREATER THAN 10 TO THE SEVENTH POWER. THERE IS A PROVISION FOR THE INSTRUMENT ORIFICE TO BE COVERED DURING SPACECRAFT THRUSTER OPERATIONS. MORE EXPERIMENT DETAILS CAN BE FOUND IN "A NEUTRAL-ATMOSPHERE COMPOSITION EXPERIMENT FOR THE ATMOSPHERE EXPLORER -C-, -D-, -E-, -F-, D. T. PELZ ET AL. RADIO SCIENCE, VOL. 8, NO. 4, PP. 7-2 (1973).

----- AE-D, RICE -----

EXPERIMENT NAME- CAPACITANCE MANOMETER

NSSDC ID- AE-D -14

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.J. RICEAEROSPACE CORP
EL SEGUNDO, CA
OI - V.L. CARTERAEROSPACE CORP
EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THE CAPACITANCE MANOMETER TO BE FLOWN ON AE-D IS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATIONS. HOWEVER, DATA FROM THIS EXPERIMENT WILL ALSO BE CORRELATED WITH ACCELEROMETER AND ION GAUGE DATA IN EVALUATING SATELLITE DRAG. THE MANOMETER, ALSO REFERRED TO AS PRESSURE SENSOR D (PSD), WILL PROVIDE A DIRECT MEASURE OF ATMOSPHERIC PRESSURE IN THE REGION BELOW 200 KM. THE ACCURACY OF THE PSD GAUGE WILL VARY FROM ABOUT 10 PERCENT AT 120 KM TO ABOUT 40 PERCENT AT 100 KM. THE PSD WILL CONSIST OF TWO SPHERICAL, THERMALLY CONTROLLED CHAMBERS, SEPARATED BY A THIN MEMBRANE STRETCHED FLAT AND UNDER RADIAL TENSION. ANY DEFECTION OF THE DIAPHRAGM CAUSED BY A PRESSURE DIFFERENTIAL BETWEEN THE TWO SIDES WILL CAUSE A CHANGE IN CAPACITANCE BETWEEN THE DIAPHRAGM AND AN ADJACENT ELECTRODE WHICH WILL BIAS AN AC BRIDGE CIRCUIT. AIR WILL BE ALLOWED INTO ONE OF THE CHAMBERS THROUGH TWO PORTS 180 DEG APART AND PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THUS THE WAKE-RAM PRESSURE DIFFERENTIAL WILL BE SAMPLED TWICE EACH SPACECRAFT REVOLUTION.

----- AE-D, RICE -----

EXPERIMENT NAME- COLD CATHODE ION GAUGE

NSSDC ID- AE-D -15

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.J. RICEAEROSPACE CORP
EL SEGUNDO, CA
OI - V.L. CARTERAEROSPACE CORP
EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THE COLD CATHODE-ION GAUGE TO BE FLOWN ON AE-D IS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATION. HOWEVER, DATA FROM THIS EXPERIMENT WILL BE CORRELATED WITH ACCELEROMETER AND CAPACITANCE MANOMETER DATA TO EVALUATE SATELLITE DRAG PERFORMANCE. THE ION GAUGE, ALSO REFERRED TO AS PRESSURE SENSOR A (PSA), WILL MEASURE ATMOSPHERIC PRESSURE IN THE REGION BETWEEN 120 TO 370 KM ABOVE THE EARTH'S SURFACE FOR VALUES OF ATMOSPHERIC PRESSURE BETWEEN 1.3 E-3 TO E-7 MD. THE ESTIMATED ACCURACY OF THE PSA WILL BE PLUS OR MINUS 20 PERCENT. THE CYLINDRICALLY SHAPED SENSOR PACKAGE WILL CONSIST OF A WEDGE-SHAPED ORIFICE, A CATHODE NEAR GROUND POTENTIAL, AN ANODE OPERATING AT ABOUT 1300 VDC, AND A PERMANENT MAGNETIC FIELD OF ABOUT 1600 GAUSS. THE GAUGE WILL CONTAIN NO PRIMARY SOURCE OF IONIZING ELECTRONS. THE DISCHARGE WILL BE INITIATED BY FIELD EMISSION AND WILL BE SELF-SUSTAINING AT A PRESSURE ABOVE 1.3 E-7 MD. THE ION CURRENT WILL BE COLLECTED AT THE CATHODE. THE SENSOR WILL BE MOUNTED ON THE SPACECRAFT, WITH THE ORIFICE PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WILL BE NORMAL TO THE ORBITAL PLANE. THE INSTRUMENT CAN BE OPERATED IN TWO MODES, SPINNING OR DESPUN. WHEN THE SPACECRAFT IS IN A SPINNING MODE, THE PSA WILL ALTERNATELY SAMPLE THE RAM AND WAKE PRESSURE. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE PSA WILL FACE 30 DEG FROM THE DIRECTION OF MOTION. DATA FROM THIS EXPERIMENT WILL NOT BE TAPE RECORDED, BUT OBSERVED IN REAL TIME.

----- AE-D, SPENCER -----

EXPERIMENT NAME- NEUTRAL GAS TEMPERATURE AND CONCENTRATION

NSSDC ID- AE-D -09

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - N.W. SPENCERNASA-GSFC
GREENBELT, MD
OI - G.R. CARIGNANU OF MICHIGAN
ANN ARBOR, MI
OI - H.D. NIEMANNNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE THE KINETIC TEMPERATURE OF THE NEUTRAL ATMOSPHERE BY DETERMINING THE INSTANTANEOUS DENSITY OF MOLECULAR NITROGEN IN A SPHERICAL CHAMBER COUPLED TO THE ATMOSPHERE THROUGH A KNIFE-EDGED ORIFICE. ANALYSIS OF THE MEASURED MOLECULAR NITROGEN DENSITY VARIATION OVER A SPIN CYCLE WITH A KNOWLEDGE OF THE SATELLITE'S MOTION AND ORIENTATION WILL LEAD TO A DETERMINATION OF THE AMBIENT TEMPERATURE, INDEPENDENT OF SCALE HEIGHT. A MEASUREMENT OF THE AMBIENT NITROGEN DENSITY WILL ALSO BE OBTAINED. AN ALTERNATE MEASUREMENT OF NEUTRAL TEMPERATURE WILL ALSO BE UNDERTAKEN, USING A Baffle INSERTED IN FRONT OF THE ORIFICE TO INTERCEPT A PORTION OF THE GAS PARTICLE STREAM ENTERING THE CHAMBER. WHEN THE SATELLITE IS IN THE DESPUN MODE, THE Baffle WILL BE MADE TO OSCILLATE IN THE STEPWISE FASHION IN ORDER TO INTERRUPT THE PARTICLE STREAM SEEN BY THE ORIFICED CHAMBER. THESE CHAMBER DENSITY VARIATIONS CAN BE INTERPRETED TO YIELD THE NEUTRAL GAS KINETIC TEMPERATURE ALSO. A DUAL-FILAMENT ION SOURCE WILL SAMPLE THE THERMALIZED MOLECULAR NITROGEN IN THE CHAMBER AND WILL PRODUCE AN ION BEAM DENSITY PROPORTIONAL TO THE NITROGEN CHAMBER DENSITY. FROM THE SOURCE, THIS IONIZED NITROGEN BEAM WILL BE DIRECTED FROM A QUADRUPOLE ANALYZER, TUNED TO PASS THOSE PARTICLES WHOSE MASS-TO-CHARGE RATIO (M/E) IS 29, ON TO AN ELECTRON MULTIPLIER. THE OUTPUT PULSES WILL BE AMPLIFIED AND COUNTED IN A 16-BIT ACCUMULATOR. WHEN THE SATELLITE IS IN THE SPINNING MODE, THE NITROGEN DENSITY WILL BE MEASURED ONCE PER SPIN PERIOD, NOMINALLY EVERY 15 SEC. THE NITROGEN KINETIC TEMPERATURE WILL BE MEASURED TWICE EACH SPIN PERIOD (WITHOUT THE Baffle OPERATING) AND ONCE PER SPIN PERIOD WITH Baffle OPERATION. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE NITROGEN DENSITY WILL BE MEASURED NEARLY CONTINUOUSLY, EXCEPT WHEN THE PARTICLE STREAM IS INTERRUPTED BY THE Baffle EACH 2.0 SEC. IN THIS CASE, THE NITROGEN TEMPERATURE WILL BE MEASURED EACH 2.0 SEC AS THE Baffle SCANS. THE SENSOR WILL BE VACUUM-SEALED PRIOR TO LAUNCH AND OPENED TO THE ATMOSPHERE AFTER THE SPACECRAFT IS IN ORBIT. MORE EXPERIMENT DETAILS CAN BE FOUND IN "THE NEUTRAL-ATMOSPHERE TEMPERATURE INSTRUMENT," N. W. SPENCER, ET AL. RADIO SCIENCE, VOL. 8, NO. 4, PP. 287-296 (1973).

***** AE-E *****

SPACECRAFT COMMON NAME- AE-E

ALTERNATE NAMES- S 6E, ATMOSPHERE EXPLORER-E

NSSDC ID- AE-E

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- SEPT. 75 SPACECRAFT WEIGHT- 493.6 KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSF

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 129. MIN INCLINATION- 22 DEG
PERIAPSIS- 150,000 KM ALT APOAPSIS- 400,000 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.W. GRINESNASA-GSFC
GREENBELT, MD
PS - N.W. SPENCERNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

ONE OBJECTIVE OF AE-E WILL BE TO INVESTIGATE THE CHEMICAL PROCESSES AND ENERGY TRANSFER MECHANISMS THAT CONTROL THE STRUCTURE AND BEHAVIOR OF THE EARTH'S ATMOSPHERE AND IONOSPHERE THROUGH THE REGION OF HIGH SOLAR ENERGY ABSORPTION. MEASUREMENTS WILL BE ORIENTED PRIMARILY TO THE LARGELY UNEXPLORED LOW-ALTITUDE REGION BETWEEN 120 AND 300 KM. HOWEVER, PROPERTIES ABOVE 300 KM WILL ALSO BE EXTENSIVELY INVESTIGATED. THE EXPERIMENT PAYLOAD WILL INCLUDE INSTRUMENTATION FOR THE MEASUREMENT OF SOLAR EUV RADIATION, NEUTRAL PARTICLE COMPOSITION AND TEMPERATURE, ATMOSPHERIC DENSITY, ION COMPOSITION AND TEMPERATURE, ELECTRON CONCENTRATION AND TEMPERATURE, ATMOSPHERIC EMISSIONS, PARTICLE FLUXES, IONOSPHERE CURRENTS, AND THE PHOTOELECTRON ENERGY SPECTRUM. THE SATELLITE WILL BE A SHORT (1 M) CYLINDRICAL PRISM WITH A DIAMETER OF APPROXIMATELY 1.4 M. IN THE SPIN-STABILIZED MODE, THE SPACECRAFT'S SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE. POWER WILL BE SUPPLIED BY A SOLAR CELL ARRAY. THE SPACECRAFT WILL USE A PCM TELEMETRY SYSTEM THAT CAN OPERATE IN A REAL-TIME OR TAPE REORDER MODE.

AN ONBOARD PROPULSION SYSTEM WILL BE USED FOR MAKING ALTITUDE CHANGES. THE SPACECRAFT IS EXPECTED TO HAVE A 1-YR LIFETIME. MORE DETAILS CAN BE FOUND ON PP. 263-269 OF "RADIO SCIENCE," VOL. 8, NO. 4, APRIL, 1973.

----- AE-E, DRACE -----

EXPERIMENT NAME- ELECTRON TEMPERATURE AND CONCENTRATION

NSSDC ID- AE-E -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - L.H. DRACENASA-GSFC
GREENBELT, MD
OI - H.F. THEISNASA-GSFC
GREENBELT, MD
OI - A. DALGARNOHARVARD U
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE CYLINDRICAL ELECTROSTATIC PROBE WILL BE A RETARDING POTENTIAL (LANGMUIR TYPE) PROBE THAT WILL MEASURE THE CURRENT FLOWING TO THE COLLECTOR FOR A KNOWN SAWTOOTH VOLTAGE PATTERN TO BE APPLIED. FROM THIS RETARDING POTENTIAL (CURRENT VS VOLTAGE) CURVE, ELECTRON DENSITY AND ELECTRON TEMPERATURE WILL BE DERIVED. THIS PROBE WILL CONSIST OF A COLLECTOR ELECTRODE EXTENDING ALONG THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING WILL EXTEND 73 CM FROM THE SPACECRAFT, AND THE ELECTRODE WILL EXTEND ANOTHER 10 CM FURTHER FROM THE END OF THE GUARD RING. TWO IDENTICAL PROBES WILL BE MOUNTED PARALLEL TO THE SPACECRAFT SPIN AXIS (SPIN AXIS WILL BE PERPENDICULAR TO THE ORBIT PLANE), AND A THIRD PROBE WILL BE MOUNTED PERPENDICULAR TO THE SPIN AXIS. IN ADDITION TO ONBOARD ANALYSES OF THE RETARDING POTENTIAL CURVES, WHICH WILL PROVIDE TEMPERATURES AND DENSITIES, THESE CURVES WILL BE TELEMETERED.

----- AE-F, DRINTON -----

EXPERIMENT NAME- ION COMPOSITION AND CONCENTRATION

NSSDC ID- AE-F -10

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.C. DRINTONNASA-GSFC
GREENBELT, MD
OI - M.W. PHARONASA-GSFC
GREENBELT, MD
OI - H.A. TAYLOR, JR.NASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE FLOWN TO MEASURE, THROUGHOUT THE AE ORBIT, THE INDIVIDUAL CONCENTRATIONS OF ALL THERMAL ION SPECIES IN THE MASS RANGE 1 TO 72 ATOMIC MASS UNITS (AMU), AND IN THE AMBIENT DENSITY RANGE FROM 5 IONS PER CC TO 5 MILLION IONS PER CC. ANY COMBINATION OF THE FOLLOWING THREE MASS RANGES, WHICH ARE EXPRESSED IN AMU, CAN BE SELECTED BY GROUND COMMAND -- RANGE A - A TO 1, RANGE B - 18 TO 2, RANGE C - 72 TO 8. EACH RANGE WILL NORMALLY BE SCANNED IN 1.6 SEC (APPROXIMATELY 12 KM ALONG ORBIT), BUT THE SCAN TIME PER RANGE CAN BE INCREASED TO 5.1 SEC BY COMMAND. NORMAL OPERATION WILL CONSIST OF SEQUENCE ABCABC (72 TO 1 AMU IN 4.0 SEC), BUT OTHER COMBINATIONS SUCH AS DCBC AND CCCC MAY BE USED. LABORATORY AND IN-FLIGHT DETERMINATION OF SPECTROMETER EFFICIENCY AND MASS DISCRIMINATION WILL PERMIT DIRECT CONVERSION OF MEASURED ION CURRENTS TO AMBIENT CONCENTRATIONS. CORRELATION OF THESE MEASURED DATA WITH THE RESULTS FROM COMBINATION EXPERIMENTS, "ELECTROSTATIC PROBE (AE-E -01)" AND "RETARDING POTENTIAL ANALYZER (AE-F -04)," SHOULD PERMIT INDIVIDUAL ION CONCENTRATIONS TO BE DETERMINED WITH AN ACCURACY OF PLUS OR MINUS 10 PERCENT. THE EXPERIMENT'S FOUR PRIMARY MECHANICAL COMPONENTS WILL BE -- GUARD RING AND ION-ANALYZER TUBE, COLLECTOR AND PREAMPLIFIER ASSEMBLY, VENT, AND MAIN ELECTRONICS HOUSING. THE GUARD RING WILL NORMALLY BE AT GROUND POTENTIAL, BUT IT CAN BE PLACED AT -6 VOLTS BY COMMAND IF DESIRABLE. E.G., IF THE SPACECRAFT ACQUIRED A POSITIVE CHARGE. A THREE-STAGE BENNETT TUBE WITH 7- TO 8-CYCLE DRIFT SPACES WILL BE FLOWN, AND HAS BEEN MODIFIED TO PERMIT ION CONCENTRATION MEASUREMENTS TO BE OBTAINED DOWN TO 120 KM ALTITUDE. SPECIFICALLY, A VENT WILL BE PROVIDED AT THE REAR OF THE SPECTROMETER, AND THE USUAL FLAT-DISK ION-CURRENT COLLECTOR WILL BE REPLACED BY A STACK OF WIRE-MESH GRIDS. THE FREQUENCY OF THE 30 V PFAK-TO-PEAK H.F. VOLTAGE WILL VARY WITH THE MASS RANGE MEASURED -- RANGE A - 10 MHZ, RANGE B - 5 MHZ, AND RANGE C - 2.0 MHZ. MOUNTED IN THE VACUUM TIGHT ALUMINUM-KERAMIC CYLINDRICAL ANALYZER TUBE WILL BE A SERIES OF 16 PARALLEL TUNGSTEN-MESH GRIDS. THE BALANCE BETWEEN ION-CURRENT SENSITIVITY AND MASS-RESOLUTION IN A BENNETT SPECTROMETER MAY BE ALTERED BY CHANGING APPROPRIATE VOLTAGES. THESE VOLTAGE CHANGES CAN BE CONTROLLED INDEPENDENTLY BY GROUND COMMAND FOR EACH ONE OF THE THREE MASS RANGES. PRIMARY ANALOG INSTRUMENT OUTPUT WILL BE A COMPRESSED ION CURRENT SPECTRUM WHICH WILL DISPLAY THE FULL DYNAMIC RANGE OF THE AMPLIFIER SYSTEM ON A SINGLE TELEMETRY CHANNEL. ONBOARD DATA PROCESSING WILL PROVIDE A READOUT OF PRIMARY EXPERIMENT DATA IN THE FORM OF TWO DIGITAL WORDS FOR EACH PEAK IN THE ION SPECTRUM. ONE EIGHT-BIT WORD WILL INDICATE PEAK AMPLITUDE (CURRENT) AND THE OTHER EIGHT-BIT WORD WILL IDENTIFY SWEEP POSITION, I.E., SPECIES

IDENTIFICATION. THE WORDS WILL BE READ OUT IN PAIRS AT THE MAIN FRAME TELEMETRY RATE OF 16 SAMPLES PER SEC. THE INSTRUMENT CONFIGURATION SELECTED FOR A PARTICULAR PASS WILL DEPEND PRIMARILY ON THE DATA REQUIREMENTS OF THE SCIENCE PROBLEM UNDER INVESTIGATION AND ON THE SPACECRAFT SPIN MODE. MORE COMPLETE EXPERIMENT DETAILS CAN BE FOUND IN THE PAPER "THE BENNETT ION-MASS SPECTROMETER ON ATMOSPHERE EXPLORER-C AND -E," H. C. DRINTON ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 323-332 (1973).

----- AE-E, CHAMPION -----

EXPERIMENT NAME- ATMOSPHERIC DRAG

NSSDC ID- AE-E -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.S.W. CHAMPIONUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - F.A. MARCOSUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERIC DENSITY ACCELEROMETER EXPERIMENT WILL OBTAIN DATA ON THE NEUTRAL DENSITY OF THE ATMOSPHERE IN THE ALTITUDE RANGE 120 TO 400 KM BY THE MEASUREMENT OF SATELLITE DECELERATION DUE TO AERODYNAMIC DRAG. THE EXPERIMENT WILL CONSIST OF THREE SINGLE-AXIS ACCELEROMETERS. TWO OF THE UNITS WILL LIE IN THE SPACECRAFT X-Y PLANE, AND THE THIRD WILL BE ALIGNED WITH THE Z AXIS. EACH INSTRUMENT WILL MEASURE THE ELECTROSTATIC FORCE REQUIRED TO RESTRAIN A HOLLOW CYLINDRICAL MASS UNDER EXTERNAL ACCELERATION. THE DYNAMIC RANGE OF EACH UNIT WILL BE 10 TO THE -6 TO 10 TO THE -12 GRAMS.

----- AE-E, DOERING -----

EXPERIMENT NAME- PHOTOELECTRON SPECTROMETER

NSSDC ID- AE-E -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.P. DOERINGJOHNS HOPKINS U
BALTIMORE, MD
OI - C.O. GOSTROMAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - J.C. ARMSTRONGAPPLIED PHYSICS LAB
SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE INTENSITY AND ENERGY DISTRIBUTION OF THE PHOTOELECTRON FLUX IN THE THERMOSPHERE IN THE RANGE 2 TO 500 EV. THE INSTRUMENTATION WILL CONSIST OF TWO OPPOSITELY DIRECTED HEMISPHERICAL-ELECTROSTATIC DEFLECTORS COUPLED TO SEPARATE ELECTRON MULTIPLIER DETECTORS. THE PHOTOELECTRON ENERGY SPECTRUM WILL BE SCANNED BY 1-SEC SWEEPS OF THE VOLTAGE BETWEEN THE TWO HEMISPHERICAL DEFLECTION ELEMENTS OF EACH DEFLECTOR.

----- AE-E, HANSON -----

EXPERIMENT NAME- ION TEMPERATURE

NSSDC ID- AE-E -04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.B. HANSONU OF TEXAS, DALLAS
DALLAS, TX
OI - J.R. ZUCCAROU OF TEXAS, DALLAS
DALLAS, TX
OI - S. SANTINIU OF TEXAS, DALLAS
DALLAS, TX
OI - C.R. LIPPENCOTTU OF TEXAS, DALLAS
DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

THE PLANAR ION TRAP, A RETARDING POTENTIAL TYPE OF INSTRUMENT, WILL MEASURE CURRENT FLOWING TO A COLLECTOR FOR A KNOWN LINEAR VOLTAGE SWEEP TO BE APPLIED TO THE COLLECTOR. THE ION TEMPERATURE, ION DENSITY, COMPOSITION, SUPRATHERMAL ELECTRON FLUXES, AND SUPRATHERMAL ELECTRON TEMPERATURES WILL BE DETERMINED FROM THIS RETARDING POTENTIAL CURVE AND KNOWLEDGE OF THE VOLTAGE ON SUPPRESSOR GRIDS BETWEEN THE INSTRUMENT APERTURE AND THE COLLECTOR. THE EXPERIMENT WILL OPERATE IN ONE MODE WHILE THE SPACECRAFT IS SPINNING AND IN A SECOND MODE WHEN THE SPACECRAFT IS NOT SPINNING. A COMPLETE VOLTAGE SWEEP (BOTH DOWN AND UP -- +23 TO 0 TO +23 V) COULD BE ACCOMPLISHED IN 3 SEC. IN THE NONSPINNING MODE, AN ADDITIONAL 3-SEC "DUCT" MODE WILL OPERATE TO PROVIDE MEASUREMENTS FROM WHICH FRACTIONAL ION CONCENTRATION CHANGES AS SMALL AS 0.001 IONS/CC PER 130 M ALONG TRACK TRAVEL COULD BE MADE.

----- AE-E, HAYS -----

EXPERIMENT NAME- AIRGLOW PHOTOMETER

NS50C ID- AE-E -11

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P.D. HAYSU OF MICHIGAN
ANN ARBOR, MI
OI - G.G. SHEPHERDTORONTO, ONTARIO, CANADA
OI - G.R. CARIGNANU OF MICHIGAN
ANN ARBOR, MI
OI - J.C.G. WALKERYALE U
NEW HAVEN, CT

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL PROVIDE VOLUME EMISSION RATES FOR SEVERAL DAYGLOW AND NIGHTGLOW OPTICAL EMISSION FEATURES. A PHOTOMETER WILL BE USED, WHICH WILL CONTAIN TWO SEPARATE OPTICAL CHANNELS. SPECTRAL SELECTION WILL BE ACCOMPLISHED WITH A FILTER WHEEL THAT WILL CONTAIN SIX INTERFERENCE FILTERS AND A DARK AND CALIBRATE POSITION. THE TWO CHANNELS WILL BE SEPARATED IN ANGLE BY 90 DEG. ONE CHANNEL WILL HAVE A 3-DEG HALF-ANGLE CONE FIELD OF VIEW FOR HIGH SENSITIVITY AND WILL NORMALLY POINT TOWARD THE LOCAL ZENITH. THE SECOND CHANNEL WILL HAVE A FIELD OF VIEW OF 0.75-DEG HALF-ANGLE CONE FOR HIGH SPATIAL RESOLUTION POINTING TANGENT TO THE SURFACE OF THE EARTH WHEN THE SATELLITE IS IN THE ORIENTED MODE. BOTH CHANNELS WILL BE PROTECTED FROM STRAY LIGHT CONTAMINATION DURING THE DAYTIME WITH MULTISTAGE DAPPLE SYSTEMS. ENTERING PHOTONS WILL BE MEASURED WITH A PULSE COUNTING PHOTOMULTIPLIER SYSTEM CAPABLE OF COUNTING AT A RATE OF 5 TIMES 10 TO THE 6 COUNTS/SEC. THE SYSTEM DESIGN WILL PERMIT THE PHOTOMETERS TO MAKE VALID DAYGLOW MEASUREMENTS WITHIN 200 MSEC AFTER HAVING THE SUN IN THE FIELD OF VIEW. FILTERS CAN BE OPERATED IN SEVERAL MODES INCLUDING FIXED FILTER AND AUTOMATIC FILTER CHANGE SYNCHRONIZED TO SATELLITE ORIENTATION. THE TWO SEPARATE OPTICAL CHANNELS WILL BE MONITORED AT TIME INTERVALS CONSISTENT WITH THEIR ANGULAR RESOLUTION IN THE SPINNING MODE. THE NARROW CHANNEL WILL HAVE AN INTEGRATION PERIOD OF 30 MSEC AND THE WIDE CHANNEL A PERIOD OF 120 MSEC. BASIC DATA ANALYSIS WILL YIELD THE VOLUME EMISSION RATE ALONG THE SATELLITE TRACK, AND THE NARROW CHANNEL WILL PROVIDE VOLUME EMISSION RATES VS ALTITUDE THROUGHOUT THE ENTIRE PERIGEE REGION. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE VISIBLE-AIRGLOW EXPERIMENT ON ATMOSPHERE EXPLORER,' P. D. HAYS, ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 369 (1973).

----- AE-E, HEATH -----

EXPERIMENT NAME- SOLAR EUV FILTER PHOTOMETER

NS50C ID- AE-E -05

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.F. HEATHNASA-GSFC
GREENBELT, MD
OI - J. OSANTOWSKINASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERE EXPLORER E SOLAR EUV FILTER PHOTOMETER EXPERIMENT WILL HAVE TWO PRIMARY OBJECTIVES -- (1) TO MONITOR SOLAR EUV FLUX IN SIX WAVELENGTH INTERVALS FROM 40 TO 1100 Å AND (2) TO MEASURE THE ORDOAND AND ATMOSPHERIC ABSORPTION AS A FUNCTION OF ALTITUDE TO DETERMINE EFFECTIVE IONIZATION RATES AS A FUNCTION OF ALTITUDE FOR MOLECULAR OXYGEN AND ATOMIC OXYGEN. SECONDARY OBJECTIVES WILL BE TO PROVIDE COVERAGE OF TEMPORAL SOLAR EUV VARIATIONS FOR THE SELECTED GRATING SPECTROMETER EXPERIMENT AND TO PROVIDE A CHECK OF THE LONG-TERM STABILITY OF THE EUV SPECTROMETER. THE INSTRUMENT WILL BE COMPOSED OF FOUR BENDIX SPIRAL ELECTRON MULTIPLIERS, THREE PHOTODIODES, AND A STEPPED EIGHT-POSITION FILTER WHEEL THAT WILL CONTAIN SIX UNDOCKED METALLIC FILTERS THAT WILL BE TRANSPARENT IN THE VICINITY OF THE PLASMA FREQUENCY. THE FILTER PHOTOMETER WILL HAVE A TRANSPARENT POSITION, A CALIBRATION POSITION, AND AN OPAQUE POSITION. SINCE EACH OF THE FILTERS WILL BE WED TO EACH OF THE DETECTORS, THIS CONFIGURATION WILL PROVIDE AN INFLIGHT RELATIVE CALIBRATION OF ALL THE DETECTORS. THE EXPERIMENT WILL BE RIGIDLY MOUNTED ON THE +Z AXIS. THE TILT ANGLE WILL BE OPTIMIZED, DEPENDING ON THE SELECTED SPACECRAFT ORBITAL PARAMETERS, FOR MAXIMUM SUN VIEWING TIME FOR BOTH THE SPINNING AND THE EARTH-ORIENTED SPACECRAFT OPERATING MODES. ADEQUATE TEMPORAL COVERAGE OF THE SUN WILL BE PROVIDED BY THE LARGE INSTRUMENT FIELD OF VIEW (PLUS OR MINUS 30 DEG).

----- AE-E, HINTERFEGGER -----

EXPERIMENT NAME- SOLAR EUV SPECTROPHOTOMETER

NS50C ID- AE-E -00

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.E. HINTERFEGGERUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - D.E. DEDDUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - L.A. HALLUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - J.E. HANSONUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - C.W. CHAGNONUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

SIX GRAZING-INCIDENCE GRATING MONOCHROMATORS, WHICH WILL COMPRISE THE EUV SPECTROPHOTOMETER, WILL PROVIDE MEASUREMENTS OF THE SOLAR EUV FLUX IN THE 170- TO 1700-Å RANGE. THIS INSTRUMENT WILL HAVE MODERATE SPECTRAL RESOLUTION (2 Å AT 300 Å) AND WILL BE CAPABLE OF SCANNING THE ENTIRE RANGE OR SELECTING SIX NARROW BANDS FOR CONTINUOUS HIGH TIME RESOLUTION MONITORING. THE INSTRUMENT, WHICH WILL BE POINTED TOWARDS THE SUN WITH AN ACCURACY OF 2 ARC-MIN, WILL PROVIDE DATA REFLECTING THE SOLAR INPUT AND DATA INDICATING ATMOSPHERIC ATTENUATION.

----- AE-E, NIER -----

EXPERIMENT NAME- OPEN SOURCE NEUTRAL MASS SPECTROMETER

NS50C ID- AE-E -07

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.D.C. NIERU OF MINNESOTA
MINNEAPOLIS, MN
OI - W.E. POTTERU OF MINNESOTA
MINNEAPOLIS, MN
OI - K. MAUERSBERGERU OF MINNESOTA
MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO CONTRIBUTE TO A STUDY OF THE CHEMICAL, DYNAMIC, AND ENERGETIC PROCESSES THAT CONTROL THE STRUCTURE OF THE THERMOSPHERE, BY PROVIDING DIRECT, IN SITU MEASUREMENTS OF CONCENTRATIONS OF BOTH THE MAJOR AND MINOR NEUTRAL ATMOSPHERIC CONSTITUENTS HAVING MASSES IN THE RANGE FROM 1 TO 40 AMU. A DOUBLE-FOCUSING MATAUCH-HERZOG MAGNETIC DEFLECTION MASS SPECTROMETER WITH AN IMPACT ION SOURCE WILL BE USED. TWO ION COLLECTORS WILL BE INCLUDED TO MEASURE SIMULTANEOUSLY IONS DIFFERING IN MASS BY A FACTOR OF EIGHT, I.E., THE TWO MASS RANGES COVERED WILL BE 1 TO 8 AMU AND 7 TO 40 AMU. AN OPEN ION SOURCE WILL BE USED TO MINIMIZE THE LOSS OF REACTIVE SPECIES SUCH AS ATOMIC OXYGEN. NORMALLY, A 100 MICROAMPERE BEAM OF 75 EV ELECTRONS WILL BE USED FOR PRODUCING THE IONS. IN VIEW OF THE OVERALL GEOMETRY OF THIS INSTRUMENT, APPROXIMATELY 10 TO THE -5 AMPERE OF RESOLVED MASS 28 IONS WILL APPEAR AT THE COLLECTOR FOR MOLECULAR NITROGEN GAS WHEN THE MOLECULAR NITROGEN PRESSURE IN THE SOURCE IS EQUAL TO 1 TORR (1.33 MB). THE ELECTRON ACCELERATING VOLTAGE CAN BE REDUCED TO 25 EV ON COMMAND. AT THIS LOWER ENERGY, THERE SHOULD NOT BE ANY DISSOCIATION OF MOLECULAR NITROGEN, AND, THEREFORE, IT WILL BE POSSIBLE TO TRY TO MEASURE ATMOSPHERIC ATOMIC NITROGEN. ELECTRON MULTIPLIERS IN THE COUNTING MODE WILL BE USED AS DETECTORS FOR BOTH HIGH- AND LOW-MASS ION COLLECTORS. A 50-PERCENT TRANSMISSION GRID, MOUNTED BETWEEN THE HIGH-MASS COLLECTOR SLIT AND ITS MULTIPLIER DETECTOR, WILL INTERCEPT HALF THE BEAM. THE GRID WILL BE CONNECTED TO AN ELECTROMETER AMPLIFIER, AND, THEREFORE, THE DYNAMIC RANGE OF THE MEASUREMENTS WILL BE EXTENDED BY ALLOWING SENSIBLE READOUTS AT 10⁻¹¹ CURRENT MAGNITUDES TWO LARGE FOR THE ELECTRON MULTIPLIER OPERATION. PLANNED OVERLAP IN THE RANGES OF THE TWO MEASURING TECHNIQUES WILL PERMIT A CHECK OF THE GAIN CHARACTERISTICS OF THE MULTIPLIER TO BE MADE. SEVERAL MEASUREMENT MODES WILL BE AVAILABLE AND WILL BE SELECTED BY GROUND COMMAND DURING FLIGHT. USUALLY THE MASS SPECTROMETER WILL BE STEPPED FROM ONE MASS OF INTEREST TO ANOTHER UNDER THE CONTROL OF A 32-STEP READ-ONLY MEMORY DEVICE. EIGHT OF THESE 32-STEP PROGRAMS FALL INTO THE FOLLOWING FOUR CATEGORIES -- (1) NORMAL PROGRAMS THAT CONCENTRATE ON THE PEAKS OF GREATEST ABUNDANCES SUCH AS MOLECULAR AND ATOMIC OXYGEN, MOLECULAR NITROGEN, HELIUM, AND ARGON; (2) MINOR CONSTITUENT PROGRAMS THAT OBTAIN MEASUREMENTS OF THE DOMINANT SPECIES TO PERMIT THE ELECTRON MULTIPLIER TO OPERATE AT LOWER ALTITUDES THAN OTHERWISE POSSIBLE; (3) A LOW-MASS PROGRAM THAT CONCENTRATES ON MASSES FROM 1 TO 5 AMU, AND (4) A NITROGEN OXIDE PROGRAM THAT MEASURES THIS MASS-30 CONSTITUENT NEARLY CONTINUOUSLY. IN ADDITION, AN OPTION WILL BE AVAILABLE TO COMMAND THE SPECTROMETER TO SCAN THE MASS RANGE IN 0.25-AMU STEPS. ABUNDANT CONSTITUENTS WILL BE MEASURED APPROXIMATELY ONCE EACH HALF-SEC, CORRESPONDING TO A SPATIAL RESOLUTION OF APPROXIMATELY 5 KM ALONG THE SATELLITE TRACK. THE RANGE OF OPERATION FOR THE ELECTROMETER WILL BE APPROXIMATELY 2.4 TIMES 10 TO THE -14 TO 4.8 TIMES 10 TO THE -9 AMP, AND FOR THE MULTIPLIER THE UPPER LIMIT WILL BE 3 TIMES 10 TO THE -6 COUNTS/SEC. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'THE OPEN SOURCE NEUTRAL-MASS SPECTROMETER ON ATMOSPHERE EXPLORER-C,' -D. AND -E. A. D. NIER ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 271 (1973).

----- AE-E, PELZ -----

EXPERIMENT NAME- CLOSED SOURCE NEUTRAL MASS SPECTROMETER

NSSDC ID- AE-E -08

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - D.T. PELZ NASA-GSFC

OI - C.A. REBER NASA-GSFC

OI - G.R. CARIGNAN OF MICHIGAN

OI - A.E. MEDIN NASA-GSFC

GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE IN SITU THE SPATIAL DISTRIBUTION AND TEMPORAL CHANGES OF THE CONCENTRATIONS OF THE NEUTRAL ATMOSPHERIC SPECIES. IN ADDITION, NEW INSIGHT INTO IN SITU MEASUREMENT TECHNIQUES MAY BE OBTAINED FROM COMPARISONS OF THESE MEASUREMENTS WITH THOSE OBTAINED FROM OTHER ONBOARD EXPERIMENTS. NAMELY -- OPEN SOURCE SPECTROMETER (AE-E -07), SOLAR EUV SPECTROPHOTOMETER (AE-E -06), AND DENSITY-ACCELEROMETER (AE-E -02). THE MASS-SPECTROMETER SENSOR WILL INCLUDE A GOLD-PLATED STAINLESS STEEL THERMALIZING CHAMBER AND ION SOURCE, A HYPERBOLIC ROD QUADRUPOLE ANALYZER, AND AN OFF-AXIS ELECTRON MULTIPLIER. APPROXIMATE UPPER ALTITUDE LIMITS OF MEASUREMENT, DETERMINED PRIMARILY BY GAS/SURFACE INTERACTIONS AND INSTRUMENT SENSITIVITY LIMITATIONS, WILL BE -- 250 KM FOR MOLECULAR OXYGEN, 300 KM FOR ARGON, 550 KM FOR MOLECULAR NITROGEN, 700 KM FOR ATOMIC OXYGEN, AND 1000 KM FOR HELIUM. FIVE DIFFERENT SEQUENCES OF MASS SELECTION WILL BE AVAILABLE AND, EXPRESSED IN ATOMIC MASS UNITS (AMU), WILL BE -- (A) GEOPHYSICAL - 1, 2, 4, TOTAL, 16, 20, 32, SELECTED, 40, (B) ANALYTICAL - 12, 14, 16, 20, 22, 30, 44, CALIBRATE, ZERO, (C) INDIVIDUAL - SELECTED, SELECTED, SELECTED, . . . (ANY MASS 1 TO 44), (D) SWEEP DIGITAL - 1, 2, 3, 4, 5, . . . 45 (IN 3/16-AMU STEPS), (E) SWEEP ANALOG - 2, 3, 4, 5, 45 (CONTINUOUS). THE FIVE OPERATIONAL FORMATS USED CAN BE SELECTED BY GROUND COMMAND, AND EACH ONE WILL CONTAIN A DIFFERENT COMBINATION OF THE FIVE MASS SELECTION SEQUENCES LISTED ABOVE. WHEN OPERATING IN THE 'NORMAL' FORMAT, THE ANALYZER WILL MEASURE ALL MASSES IN THE RANGE 1 TO 45 WITH EMPHASIS ON HYDROGEN, HELIUM, OXYGEN, NITROGEN, AND ARGON. ANOTHER FORMAT WILL BE OPTIMIZED FOR MINOR CONSTITUENT STUDIES OF ANY INDIVIDUAL GAS SPECIES IN THE MEASURED RANGE. SPATIAL RESOLUTION WILL BE DETERMINED PRIMARILY BY THE MODE OF SPACECRAFT OPERATION. WHEN THE SPACECRAFT IS SPINNING AT 4 RPM, MEASUREMENTS OF THE PRINCIPAL ATMOSPHERIC SPECIES WILL BE OBTAINED AT 12-KM INTERVALS (1.5 SEC) ALONG THE SATELLITE TRACK. WHILE THE INSTRUMENT IS FACING FORWARD, USING 'NORMAL' FORMAT, ALL MEASUREMENTS WILL BE MADE AT 12-KM INTERVALS WHEN THE SPACECRAFT IS DESPUN. IN ORBIT, THE PRESEALED SPECTROMETER WILL BE OPENED, AND THE ATMOSPHERIC CONSTITUENTS WILL PASS THROUGH A KNIFE-EDGED ORIFICE INTO THE THERMALIZATION CHAMBER AND ION SOURCE. SELECTED IONS WILL LEAVE THE QUADRUPOLE ANALYZER THROUGH A WEAK FOCUSING LENS AND WILL BE ACCELERATED INTO A 14-STAGE ELECTRON MULTIPLIER, WHERE THEY WILL BE TURNED 90 DEG TO STRIKE THE FIRST DYNODE. FOR EACH IMPACTING ION, THE MULTIPLIER OUTPUT WILL BE A PULSE OF 2×10 TO THE SIXTH POWER ELECTRONS. THESE OUTPUT PULSES WILL CONSTITUTE THE MEASUREMENT, AND THE COUNT RATE WILL BE PROPORTIONAL TO THE CHAMBER DENSITY OF THE SELECTED SPECIES. THESE DENSITY VALUES WILL THEN BE CONVERTED TO AMBIENT CONCENTRATIONS. THE ANALYZER WILL NORMALLY OPERATE AT A RESOLUTION OF 1 AMU OVER THE MASS RANGE, SO THAT A MASS PEAK ONE-THIRDS OF THE AMPLITUDE OF AN ADJACENT PEAK CAN BE MEASURED. FOR THE DYNAMIC RANGE REQUIRED, PULSES OCCURRING DURING 0.015-SEC INTEGRATION INTERVALS WILL BE ACCUMULATED IN A 16-BIT COUNTER. MULTIPLE INTEGRATION PERIODS (UP TO 16) WILL BE ASSIGNED TO EACH MEASUREMENT FOR LESS DENSE ATMOSPHERIC SPECIES. AUTOMATICALLY SELECTED RANGES OF IONIZING ELECTRON CURRENTS WILL BE USED. THE OVERALL DYNAMIC RANGE OF THE MEASUREMENTS WILL BE GREATER THAN 10 TO THE SEVENTH POWER. THERE IS PROVISION FOR THE INSTRUMENT ORIFICE TO BE COVERED DURING SPACECRAFT THRUSTER OPERATIONS. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'A NEUTRAL-ATMOSPHERE COMPOSITION EXPERIMENT FOR THE ATMOSPHERE EXPLORER -C, D, -E', D. T. PELZ ET AL, RADIO SCIENCE, VOL. 8, NO. 4, PP. 272 (1973).

----- AE-E, RICE -----

EXPERIMENT NAME- CAPACITANCE MANOMETER

NSSDC ID- AE-E -12

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - C.J. RICE AEROSPACE CORP

OI - V.L. CARTER AEROSPACE CORP

EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THE CAPACITANCE MANOMETER TO BE FLOWN ON AE-E IS PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATIONS. HOWEVER, DATA FROM THIS EXPERIMENT WILL ALSO BE CORRELATED WITH ACCELEROMETER AND ION GAUGE DATA

IN EVALUATING SATELLITE DRAG. THE MANOMETER, ALSO REFERRED TO AS PRESSURE SENSOR 1 (PS1), WILL PROVIDE A DIRECT MEASURE OF ATMOSPHERIC PRESSURE IN THE REGION BELOW 200 KM. THE ACCURACY OF THE PS1 GAUGE WILL VARY FROM ABOUT 10 PERCENT AT 120 KM TO ABOUT 40 PERCENT AT 180 KM. THE PS1 WILL CONSIST OF TWO SPHERICAL, THERMALLY CONTROLLED CHAMBERS, SEPARATED BY A THIN MEMBRANE STRETCHED FLAT AND UNDER RADIAL TENSION. ANY DEFLECTION OF THE DIAPHRAGM CAUSED BY A PRESSURE DIFFERENTIAL BETWEEN THE TWO SIDES WILL CAUSE A CHANGE IN CAPACITANCE BETWEEN THE DIAPHRAGM AND AN ADJACENT ELECTRODE WHICH WILL BIAS AN AC BRIDGE CIRCUIT. AIR WILL BE ALLOWED INTO ONE OF THE CHAMBERS THROUGH TWO PORTS 180 DEG APART AND PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THUS THE WAKE-PRESSURE DIFFERENTIAL WILL BE SAMPLED TWICE EACH SPACECRAFT REVOLUTION.

----- AE-E, RICE -----

EXPERIMENT NAME- COLD CATHODE ION GAUGE

NSSDC ID- AE-E -13

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - C.J. RICE AEROSPACE CORP

EL SEGUNDO, CA

OI - V.L. CARTER AEROSPACE CORP

EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THE COLD CATHODE-ION GAUGE TO BE FLOWN ON AE-E WILL BE PRIMARILY AN ENGINEERING EXPERIMENT TO PROVIDE DATA ON SPACECRAFT OPERATION. HOWEVER, DATA FROM THIS EXPERIMENT WILL BE CORRELATED WITH ACCELEROMETER AND CAPACITANCE MANOMETER DATA TO EVALUATE SATELLITE DRAG PERFORMANCE. THE ION GAUGE, ALSO REFERRED TO AS PRESSURE SENSOR 4 (PS4), WILL MEASURE ATMOSPHERIC PRESSURE IN THE REGION BETWEEN 120 TO 370 KM ABOVE THE EARTH'S SURFACE FOR VALUES OF ATMOSPHERIC PRESSURE BETWEEN 1.3 E-3 TO 1.3 E-7 MB. THE ESTIMATED ACCURACY OF THE PS4 WILL BE PLUS OR MINUS 20 PERCENT. THE CYLINDRICALLY-SHAPED SENSOR PACKAGE WILL CONSIST OF A WEDGE-SHAPED ORIFICE, A CATHODE NEAR ORIFICE POTENTIAL, AN ANODE OPERATING AT ABOUT 1300 VDC, AND A PERMANENT MAGNETIC FIELD OF ABOUT 1600 GAUSS. THE GAUGE WILL CONTAIN NO PRIMARY SOURCE OF IONIZING ELECTRONS. THE DISCHARGE WILL BE INITIATED BY FIELD EMISSION AND WILL BE SELF-SUSTAINING AT A PRESSURE ABOVE 1.3 E-7 MB. THE ION CURRENT WILL BE COLLECTED AT THE CATHODE. THE SENSOR WILL BE MOUNTED ON THE SPACECRAFT, WITH THE ORIFICE PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WHICH WILL BE NORMAL TO THE ORBITAL PLANE. THE INSTRUMENT CAN BE OPERATED IN TWO MODES, SPINNING OR DESPUN. WHEN THE SPACECRAFT IS IN A SPINNING MODE, THE PS4 WILL ALTERNATELY SAMPLE THE RAM AND WAKE PRESSURE. WHEN THE SPACECRAFT IS IN THE DESPUN MODE, THE PS4 WILL FACE 30 DEG FROM THE DIRECTION OF MOTION. DATA FROM THIS EXPERIMENT WILL NOT BE TAPE RECORDED, BUT OBSERVED IN REAL TIME.

----- AE-E, SPENCER -----

EXPERIMENT NAME- NEUTRAL GAS TEMPERATURE AND CONCENTRATION

NSSDC ID- AE-E -09

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - N.W. SPENCER NASA-GSFC

GREENBELT, MD

OI - G.R. CARIGNAN OF MICHIGAN

ANN ARBOR, MI

OI - N.B. NIEMANN NASA-GSFC

GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE THE KINETIC TEMPERATURE OF THE NEUTRAL ATMOSPHERE BY DETERMINING THE INSTANTANEOUS DENSITY OF MOLECULAR NITROGEN IN A SPHERICAL CHAMBER COUPLED TO THE ATMOSPHERE THROUGH A KNIFE-EDGED ORIFICE. ANALYSIS OF THE MEASURED MOLECULAR NITROGEN DENSITY VARIATION OVER A SPIN CYCLE WITH A KNOWLEDGE OF THE SATELLITE'S MOTION AND ORIENTATION WILL LEAD TO A DETERMINATION OF THE AMBIENT TEMPERATURE, INDEPENDENT OF SCALE HEIGHT. A MEASUREMENT OF THE AMBIENT NITROGEN DENSITY WILL ALSO BE OBTAINED. AN ALTERNATE MEASUREMENT OF NEUTRAL TEMPERATURE WILL ALSO BE UNDERTAKEN, USING A BAFFLE INSERTED IN FRONT OF THE ORIFICE TO INTERCEPT A PORTION OF THE GAS PARTICLE STREAM ENTERING THE CHAMBER. WHEN THE SATELLITE IS IN A STEPWISE FASHION IN ORDER TO INTERRUPT THE PARTICLE STREAM SEEN BY THE ORIFICED CHAMBER, THESE CHAMBER DENSITY VARIATIONS CAN BE INTERPRETED TO YIELD THE NEUTRAL GAS KINETIC TEMPERATURE ALSO. A DUAL-FILAMENT ION SOURCE WILL SAMPLE THE THERMALIZED MOLECULAR NITROGEN IN THE CHAMBER AND WILL PRODUCE AN ION BEAM DENSITY PROPORTIONAL TO THE NITROGEN CHAMBER DENSITY. FROM THE SOURCE, THIS IONIZED NITROGEN BEAM WILL BE DIRECTED INTO A QUADRUPOLE ANALYZER, TUNED TO PASS THOSE PARTICLES WHOSE MASS-TO-CHARGE RATIO (M/E) IS 28, ON TO AN ELECTRON MULTIPLIER. THE OUTPUT PULSES WILL BE AMPLIFIED AND COUNTED IN A 16-BIT ACCUMULATOR. WHEN THE SATELLITE IS IN THE SPINNING MODE, THE NITROGEN DENSITY WILL BE MEASURED ONCE PER SPIN PERIOD, NOMINALLY EVERY 15 SEC. THE NITROGEN KINETIC TEMPERATURE WILL BE MEASURED TWICE EACH SPIN PERIOD (WITHOUT

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

THE Baffle OPERATING) AND ONCE PER SPIN PERIOD WITH Baffle OPERATION. WHEN THE SPACECRAFT IS IN THE DESPIN MODE, THE NITROGEN DENSITY WILL BE MEASURED NEARLY CONTINUOUSLY, EXCEPT WHEN THE PARTICLE STREAM IS INTERRUPTED BY THE Baffle EACH 2.0 SEC. IN THIS CASE, THE NITROGEN TEMPERATURE WILL BE MEASURED EACH 2.0 SEC AS THE Baffle SCANS. THE SENSOR WILL BE VACUUM-SEALED PRIOR TO LAUNCH AND OPENED TO THE ATMOSPHERE AFTER THE SPACECRAFT IS IN ORBIT. MORE EXPERIMENT DETAILS CAN BE FOUND IN "THE NEUTRAL-ATMOSPHERE TEMPERATURE INSTRUMENT," N. W. SPENCER, ET AL., RADIO SCIENCE, VOL. 8, NO. 4, PP. 287-296 (1973).

***** AEROS 2 *****

SPACECRAFT COMMON NAME- AEROS 2
ALTERNATE NAMES- AEROS-B
NSSDC ID- 74-055A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/06/74.

LAUNCH DATE- 07/16/74 SPACECRAFT WEIGHT- 125. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
FED REP OF GERMANY GFW
UNITED STATES NASA-OS5

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 07/17/74
ORBIT PERIOD- 95.5 MIN INCLINATION- 97.4 DEG
PERIAPSIS- 217. KM ALT APOAPSIS- 000. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 08/06/74
ORBIT PERIOD- 95.206 MIN INCLINATION- 97.45 DEG
PERIAPSIS- 216.05 KM ALT APOAPSIS- 000.20 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.L. MAGNER, JR.NASA-GSFC
GREENBELT, MD
PM - N. KIENNEGES FÜR WELTRAUMFORSCH
HONN, FED REP OF GERMANY
PS - P. LAEMMERZAHNMPI-NUCLEAR PHYS
HEIDELBERG, FED REP OF GERMANY
PS - S.J. BAUERNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE AEROS B SATELLITE HAD A CYLINDRICAL SHAPE, A DIAMETER OF 0.914 M, AND A HEIGHT OF 0.710 M. IT WAS LAUNCHED INTO AN ELLIPTICAL, POLAR, NEARLY SUN-SYNCHRONOUS EARTH ORBIT. THE SPACECRAFT WAS SPIN-STABILIZED AT 10 RPM AND ORIENTED WITH THE SPIN AXIS TOWARD THE SUN. THE PURPOSE OF THE MISSION WAS TO STUDY THE STATE AND BEHAVIOR OF THE UPPER ATMOSPHERE AND IONOSPHERIC RADIATION, ESPECIALLY WITH REGARD TO THE INFLUENCE OF THE SOLAR UV RADIATION. FIVE EXPERIMENTS PROVIDED DATA WHICH INCLUDED THE TEMPERATURE AND DENSITY OF ELECTRONS, IONS, AND NEUTRAL PARTICLES, THE COMPOSITION OF IONS AND NEUTRAL PARTICLES, AND SOLAR ULTRAVIOLET FLUX.

----- AEROS 2, KRANKOWSKY -----

EXPERIMENT NAME- MASS SPECTROMETER (MS)

NSSDC ID- 74-055A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/06/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.K.H. KRANKOWSKYMPI-NUCLEAR PHYS
HEIDELBERG, FED REP OF GERMANY
OI - P. LAEMMERZAHNMPI-NUCLEAR PHYS
HEIDELBERG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS FLOWN TO PROVIDE MEASUREMENTS OF NEUTRAL AND IONIZED ATMOSPHERIC SPECIES IN THE MASS RANGE FROM 1 TO 44 AMU. THE QUADRUPOLE MASS ANALYZER, WITH ITS "SEMI-OPEN" ION SOURCE, WAS SEALED UNDER VACUUM AND OPENED IN ORBIT. FOR AN ATMOSPHERE WITH AN EXOSPHERIC TEMPERATURE OF APPROXIMATELY 1500 DEG K, THE UPPER ALTITUDE LIMITS OF NEUTRAL MEASUREMENTS FOR DIFFERENT GAS SPECIES WAS -- MOLECULAR NITROGEN - 660 KM, MOLECULAR OXYGEN - 300 KM, ATOMIC OXYGEN - 800 KM, ARGON - 250 KM, AND HELIUM - 000 KM. ION DENSITIES FROM 1 PER CC TO 10 TO THE 6 PER CC WERE MEASURED THROUGHOUT THE ORBIT. THE ION SOURCE WERE OPERATED IN TWO MODES. NEUTRAL GAS SPECIES WERE PARTLY IONIZED BY A REGULATED 100-MICROAMPERE BEAM OF 75-EV ELECTRONS PRODUCED BY EITHER OF TWO REDUNDANT HOT FILAMENTS THAT WERE SELECTED BY GROUND COMMAND. THE IONS WERE FOCUSED INTO THE MASS ANALYZER BY AN ION LENS SYSTEM COMPOSED OF A REPELLING GRID AND TWO ACCELERATION LENSES. IN THE ION MODE, THE AMBIENT IONS DRIFTING INTO THE ION SOURCE REGION WERE ATTRACTED BY A NEGATIVELY-BIASED GRID AND SUBSEQUENTLY FOCUSED INTO THE ANALYZER. THE MASS RESOLUTION WAS ADJUSTED TO BE 30, AND A SWEEP THROUGH THE ENTIRE MASS RANGE TOOK 1.22 SEC. AFTER LEAVING THE MASS ANALYZER, THE INDIVIDUAL ION CURRENTS WERE DETECTED BY A PARTICLE MULTIPLIER FOLLOWED BY A LOGARITHMIC ELECTROMETER, AND BY A GRID CURRENT FED INTO A LINEAR ELECTROMETER. THE VOLTAGE OUTPUT OF THE LOGARITHMIC ELECTROMETER REPRESENTED A QUANTITATIVE MEASURE OF THE CORRESPONDING PARTICLE NUMBER DENSITIES OF NEUTRALS WITHIN THE

ION SOURCE. THE VOLTAGE OUTPUT OF THE LINPAR ELECTROMETER REPRESENTED A QUANTITATIVE MEASURE OF THE CORRESPONDING ION CURRENT (IONS/SEC) OF AMBIENT IONS ENTERING THE EQUIPMENT. THE UPPER LIMIT OF CURRENT THAT COULD BE MEASURED BY THE LOG AMPLIFIER WAS 5 TIMES 10 TO THE -6 AMP, CORRESPONDING TO A 0-V TELEMETRY OUTPUT SIGNAL. AUTOMATIC CALIBRATION AND ZEROING SIGNALS WERE INCLUDED. THE EXPERIMENT WEIGHED 7.0 KG, AND THE AVERAGE POWER DISSIPATED OVER AN ORBIT WILL BE 0 W.

----- AEROS 2, NESKE -----

EXPERIMENT NAME- ELECTRON CONCENTRATION IN THE IONOSPHERE

NSSDC ID- 74-055A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/06/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - E. NESKEWGSPR
FREIBURG, FED REP OF GERMANY
OI - R. KISTWGSPR
FREIBURG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
THE IMPEDANCE PROBE AND VEHICLE BODY COMPRISED TWO PLATES OF A CONDENSER. IMPEDANCE CHANGES DUE TO THE CHANGE IN DIELECTRIC (PLASMA) CHARACTERISTICS OF THE CONDENSER WERE OBSERVED BY MEASURING RESONANCE FREQUENCIES BETWEEN THE CAPACITATOR AND VARIABLE FEEDING FREQUENCIES. THE ELECTRON DENSITY WAS COMPUTED FROM THE OBSERVED RESONANCE FREQUENCY. FREQUENCIES RANGED FROM 0.6 TO 10 MHZ, WHICH CORRESPONDED TO ELECTRON DENSITIES FROM 5×10^{13} TO 10^{16} ELECTRONS/CM CUBED.

----- AEROS 2, ROEMER -----

EXPERIMENT NAME- ATMOSPHERIC DRAG ANALYSIS

NSSDC ID- 74-055A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/06/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - W. ROEMERU OF BONN
BONN, FED REP OF GERMANY
OI - C. WULF-MATHIESU OF BONN
BONN, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
THE AEROS ATMOSPHERIC DRAG DENSITY EXPERIMENT PROVIDED INDIRECT MEASUREMENTS OF UPPER ATMOSPHERIC DENSITY NEAR SATELLITE PERIGEE. THE EXPERIMENT HAD NO UNIQUE HARDWARE ON BOARD. THE DENSITY VALUES WERE DERIVED FROM SEQUENTIAL OBSERVATIONS OF THE SATELLITE'S POSITION. TO BE LAUNCHED INTO AN ELLIPTIC (APOGEE 864 KM, PERIGEE 218 KM) NEAR-POLAR ORBIT. THE AEROS SATELLITE WAS EXPECTED TO YIELD SYSTEMATIC CHANGES IN DENSITY AS A FUNCTION OF ALTITUDE, LATITUDE, AND TIME. THE DATA OBTAINED WAS CORRELATED WITH DENSITY VALUES SIMULTANEOUSLY DERIVED FROM DIRECT PARTICLE DETECTION USING AN ONBOARD NEUTRAL DENSITY GAUGE.

----- AEROS 2, SCHMIDTKE -----

EXPERIMENT NAME- FLUX AND SPECTRAL DISTRIBUTION OF SOLAR EUV RAD AND THEIR TEMP AND SPATIAL VAR

NSSDC ID- 74-055A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 09/06/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G. SCHMIDTKEWGSPR
FREIBURG, FED REP OF GERMANY
OI - W. SCHWEIZERWGSPR
FREIBURG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF A GRATING SPECTROMETER, A SOLAR COLLIMATOR, AND A PHOTOMULTIPLIER. IT OPERATED IN 2 CHANNELS, 150 TO 510 Å AND 300 TO 1070 Å, AND MEASURED THE FLUX AND SPECTRAL DISTRIBUTION OF THE SOLAR EUV RADIATION AND ITS TEMPORAL AND SPATIAL VARIATIONS.

----- AEROS 2, SPENCER -----

EXPERIMENT NAME- NEUTRAL ATMOSPHERE TEMPERATURE EXPERIMENT

NSSDC ID- 74-055A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/06/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - N.W. SPENCERNASA-GSFC
GREENBELT, MD
OI - D.T. PELZNASA-GSFC
GREENBELT, MD
OI - G.P. NEWTONNASA-GSFC
GREENBELT, MD
OI - G.R. CARIGNANU OF MICHIGAN
ANN ARBOR, MI

01 - H.D. NIEMANNNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT PROVIDED IN SITU MEASUREMENTS OF THE TOTAL GAS DENSITY, THE KINETIC TEMPERATURE OF MOLECULAR NITROGEN IN THE THERMOSPHERE, AND THE MOLECULAR NITROGEN DENSITY. THE USEFUL ALTITUDE RANGE OF THE EXPERIMENT WAS DETERMINED AT THE UPPER LIMIT BY THE SIGNAL-TO-NOISE RATIO, AND AT THE LOWER LIMIT BY THE MAXIMUM INTERNAL NUMBER DENSITY, AT WHICH THE ION SOURCE COULD PROPERLY OPERATE ON BY THE UPPER LIMIT OF DETECTION CAPABILITY. THE ION SOURCE SENSITIVITY COULD BE REDUCED UP TO A FACTOR OF 10 ON COMMAND. MOUNTED AT THE SATELLITE PERIPHERY WAS A SPHERICAL ANTICHAMBER WITH A KNIFE-EDGED ORIFICE FACING NORMAL TO THE SPIN AXIS. THIS CHAMBER, SEALED UNDER VACUUM BEFORE LAUNCH, WAS OPENED TO THE ATMOSPHERE ON COMMAND WHEN THE SPACECRAFT WAS IN ORBIT. THE INCOMING ATMOSPHERIC SPECIES UNDERWENT COLLISIONS WITH THE CHAMBER WALLS, AND SOME OF THIS THERMALIZED GAS ENTERED A SMALL DUAL-FILAMENT ION SOURCE, THAT PRODUCED AN ION BEAM PROPORTIONAL TO THE CHAMBER DENSITY. THE BEAM WAS DIRECTED INTO A QUADRUPOLE ANALYZER, THAT TRANSMITTED IONS WITH A MASS-TO-CHARGE RATIO OF 20, TO AN ELECTRON MULTIPLIER WHERE INDIVIDUAL IONS AT THE INPUT WERE CONVERTED TO PULSES OF ELECTRONS WHICH WERE COUNTED AT THE MULTIPLIER OUTPUT. THESE OUTPUT PULSES WERE AMPLIFIED AND SENT TO A DATA PROCESSOR THAT PROVIDED DIGITAL OUTPUT SIGNALS, IN THE PROPER FORMAT, TO THE TELEMETRY SYSTEM. THUS, THE OBJECTIVE OF THE MEASUREMENT SYSTEM WAS TO PROVIDE A DIGITAL OUTPUT THAT IS PROPORTIONAL TO THE INSTANTANEOUS DENSITY OF NEUTRAL MOLECULAR NITROGEN IN THE SPHERICAL ANTICHAMBER. A TURN-ON SEQUENCE PROVIDED THE NECESSARY VOLTAGES TO MEASURE THE CONCENTRATIONS OF SPECIES WITH MASS-TO-CHARGE RATIOS OF 4, 12, 14, 16, 18, 32, 40, AND 44. TOTAL DENSITY MEASUREMENTS WERE ALSO OBTAINED. THE INSTANTANEOUS VALUE OF THE NITROGEN DENSITY WAS SAMPLED A TOTAL OF 44 TIMES PER SPACECRAFT SPIN PERIOD, WITH INCREASED TIME RESOLUTION IN THE REGION OF THE SPIN POSITION WHERE THE ORIFICE NORMAL WAS NEARLY PERPENDICULAR TO THE SATELLITE VELOCITY VECTOR.

----- AEROS 2: SPENNER -----

EXPERIMENT NAME- ENERGY DISTRIBUTION OF IONS AND ELECTRONS

NSSDC ID- 74-055A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/01/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K. SPENNERWGSPR
FREIBURG, FED REP OF GERMANY
OI - A. DUMHSWGSPR
FREIBURG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION

A RETARDING POTENTIAL ANALYZER MEASURED THE ENERGY DISTRIBUTION OF ELECTRONS AND IONS. THE CORRESPONDING TEMPERATURES WERE DERIVED FROM THESE DISTRIBUTIONS. THE EXPERIMENT OPERATED IN AN ELECTRON MODE AND IN AN ION MODE. THE INSTRUMENT WAS ESSENTIALLY A COLLECTOR, SHIELDED BY PARALLEL PLANE GRIDS. BY SWEEPING THE RETARDING VOLTAGE OF THE GRID, THE ENERGY SPECTRA OF THE IONOSPHERIC CHARGED PARTICLES WAS OBTAINED. THE PARTICLES ONLY PASSED THROUGH THE GRID AND REACHED THE COLLECTOR IF THEIR KINETIC ENERGY EXCEEDED THE RETARDING POTENTIAL.

***** ALOUETTE 2 *****

SPACECRAFT COMMON NAME- ALOUETTE 2
ALTERNATE NAMES- ALOUETTE-2, S 270
1515-X, 01404

NSSDC ID- 65-098A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/01/73.

LAUNCH DATE- 11/29/65 SPACECRAFT WEIGHT- 145. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- THOR-AGENA

SPONSORING COUNTRY/AGENCY
CANADA CRC
UNITED STATES NASA-GSFC

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 11/29/65
ORBIT PERIOD- 121. MIN INCLINATION- 79.724 DEG
PERIAPSIS- 529.000 KM ALT APDAPSIS- 2956.00 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 01/24/72
ORBIT PERIOD- 120.48 MIN INCLINATION- 79.0147 DEG
PERIAPSIS- 510. KM ALT APDAPSIS- 2935. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MAN, PS=PROJECT SCIENTIST)
PM - J.E. JACKSONNASA-GSFC
GREENBELT, MD
PS - J.E. JACKSONNASA-GSFC
GREENBELT, MD
PS - J.H. WHITTEKERCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

SPACECRAFT BRIEF DESCRIPTION

ALOUETTE 2 WAS A SMALL IONOSPHERIC OBSERVATORY INSTRUMENTED WITH A SWEEP FREQUENCY IONOSPHERIC SOUNDER, A VLF RECEIVER, TWO ENERGETIC PARTICLE EXPERIMENTS, A COSMIC NOISE EXPERIMENT, AND AN ELECTROSTATIC PROBE. THE SPACECRAFT USED TWO LONG DIPOLE ANTENNAS (70.9 M AND 22.8 M LONG, RESPECTIVELY) FOR THE SOUNDER, VLF, AND COSMIC NOISE EXPERIMENTS. THE SATELLITE WAS SPIN-STABILIZED AT ABOUT 2-25 RPM AFTER ANTENNA DEPLOYMENT. BY JANUARY 1970, THE SPIN HAD DECAYED TO 1.84 RPM. END PLATES ON THE LONG ALOUETTE 2 ANTENNA SEEM TO HAVE CORRECTED THE RAPID DESPIN OCCURRING ON ALOUETTE 1, WHICH WAS BELIEVED TO RESULT FROM THERMAL DISTORTION OF THE ANTENNA AND RADIATION PRESSURE. THERE WAS NO TAPE RECORDER, SO THAT DATA ARE AVAILABLE ONLY FROM WHEN THE SPACECRAFT WAS IN LINE OF SIGHT OF TELEMETRY STATIONS. TELEMETRY STATIONS ARE LOCATED SO THAT PRIMARY DATA COVERAGE IS NEAR THE 80 DEG W MERIDIAN PLUS AREAS NEAR HAWAII, SINGAPORE, AUSTRALIA, ENGLAND, INDIA, NORWAY, AND CENTRAL AFRICA. INITIALLY, DATA WERE RECORDED FOR ABOUT 7-1/2 HR PER DAY. IN 1972, OBSERVATIONS WERE MADE FOR ABOUT 2 HR PER DAY. ROUTINE SPACECRAFT OPERATION WAS DISCONTINUED IN 1973, BUT SPECIAL REQUEST OPERATION HAS OCCURRED OCCASIONALLY SINCE THEN.

----- ALOUETTE 2: BELROSE -----

EXPERIMENT NAME- VLF RECEIVER

NSSDC ID- 65-098A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/01/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.S. BELROSECOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - F.H. PALMERCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THE VLF EXPERIMENT WAS A WIDEBAND HIGH-GAIN RECEIVER WITH A PASS BAND FROM 0.05 TO 30 KHZ THAT USED THE LONG SOUNDER ANTENNA. THE INSTRUMENT WAS A CONSIDERABLY IMPROVED VERSION OF THE ALOUETTE 1 RECEIVER. THE STANDARD VLF DATA FORM WAS A SONOGRAM (GRAPH) WHICH SHOWED SIGNAL AS A FUNCTION OF TIME AND FREQUENCY. WHISTLERS, IONOSPHERIC NOISE, VLF NOISE, ETC. WERE OBSERVED IN THIS VERY LOW REGION OF THE RADIO FREQUENCY SPECTRUM. PERFORMANCE WAS NOMINAL EXCEPT FOR INTERFERENCE FROM THE SOUNDER. THIS INTERFERENCE DID NOT PREVENT OBSERVATIONS OF USEFUL DATA. THE SOUNDER OPERATION WAS PREDOMINANT, BUT A SMALL PERCENTAGE OF OBSERVATIONS WERE VLF ONLY OR BOTH VLF AND SOUNDER. AN INDEX OF OPERATION TIMES AND LOCATIONS FOR THIS EXPERIMENT APPEARS IN DATA SET 65-098A-00E.

----- ALOUETTE 2: BRACE -----

EXPERIMENT NAME- CYLINDRICAL ELECTROSTATIC PROBE

NSSDC ID- 65-098A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/01/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - L.H. BRACENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS CYLINDRICAL ELECTROSTATIC PROBE OBSERVED ELECTRON DENSITY IN THE IONOSPHERE. IT WAS A TYPE OF LANGMUIR PROBE CONSISTING OF A COLLECTOR ELECTRODE EXTENDING FROM THE CENTRAL AXIS OF A CYLINDRICAL GUARD RING. THE GUARD RING EXTENDED 23 CM FROM THE SPACECRAFT AND THE COLLECTOR ELECTRODE EXTENDED 45 CM. TWO SENSORS WERE MOUNTED ON OPPOSITE SIDES OF THE LOWER PORTION OF THE SATELLITE AND BOTH EXTENDED DOWNWARD AT AN ANGLE OF 45 DEG TO THE SPACECRAFT SPIN AXIS, WHICH WAS ORIENTED IN A NORTHWARD DIRECTION IN THE ORBITAL PLANE. THE SENSORS WERE OPERATED SEQUENTIALLY. THIS EXPERIMENT OPERATED NOMINALLY FROM LAUNCH. AN INDEX OF OPERATION TIMES AND LOCATIONS FOR THIS EXPERIMENT IS AVAILABLE IN DATA SET 65-098A-00E (TAPE) OR 65-098A-00F (HARDCOPY).

----- ALOUETTE 2: HARTZ -----

EXPERIMENT NAME- COSMIC RADIO NOISE

NSSDC ID- 65-098A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/01/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.R. HARTZCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED THE IONOSPHERE RECEIVER AUTOMATIC GAIN CONTROL (AGC) VOLTAGE TO MEASURE BACKGROUND RADIO NOISE FROM THE IONOSPHERE, GALAXY, AND SUN. THE ANTENNAS WERE DIPOLES 23- AND 73-M LONG. THE RECEIVER SWPT THE RANGE 0.1 TO 15 MHZ EVERY 32 SEC. THE RECEIVER BANDWIDTH WAS 40 KHZ, AND THE DYNAMIC RANGE WAS 80 DB. THE RECEIVER SENSITIVITY PERMITTED GALACTIC RADIO EMISSION OBSERVATIONS AT FREQUENCIES GREATER THAN 0.6 MHZ. THE EXPERIMENT FUNCTIONED SATISFACTORILY, PROVIDING GOOD FREQUENCY RESOLUTION WITH

RELATIVELY POOR FLUX RESOLUTION.

----- ALOUETTE 2, MCDIARMID -----

EXPERIMENT NAME- ENERGETIC PARTICLES DETECTORS

NSSDC ID- 65-098A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/01/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - I.B. MCDIARMIDNATL RES COUNCIL OF CAN
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THE ALOUETTE 2 COSMIC PARTICLE DETECTION EXPERIMENT WAS
COMPOSED OF SEVEN DETECTORS. FOUR OF THESE WERE GEIGER-MULLER
TUBES. THE FIRST RESPONDED TO ELECTRONS GREATER THAN 3.9 MEV
AND PROTONS GREATER THAN 40 MEV. THE SECOND HAD A MAGNETIC
BROOM AND RESPONDED TO ELECTRONS GREATER THAN 250 KEV AND
PROTONS GREATER THAN 500 KEV. THE THIRD RESPONDED TO ELECTRONS
GREATER THAN 40 KEV AND PROTONS GREATER THAN 500 KEV. THESE
THREE GM TUBES WERE PERPENDICULAR TO THE SPIN AXIS. THE FOURTH
GM TUBE WAS 10 DEG FROM THE SPIN AXIS AND RESPONDED TO
ELECTRONS GREATER THAN 40 KEV AND PROTONS GREATER THAN 500
KEV. THE FIFTH DETECTOR WAS A SILICON JUNCTION WHICH DETECTED
PROTONS AND ALPHA PARTICLES WITH MINIMUM ENERGIES OF 1 AND 5
MEV, RESPECTIVELY. AND MAXIMUM ENERGIES OF 0 AND 24 MEV,
RESPECTIVELY. THE SIXTH DETECTOR WAS A GEIGER TELESCOPE WHICH
DETECTED PROTONS GREATER THAN 100 MEV. THE SEVENTH DETECTOR
WAS A PLASTIC SCINTILLATOR WHICH DETERMINED THE PROTON SPECTRA
IN THE ENERGY RANGE FROM 100 TO 600 MEV. PARTICLES ASSOCIATED
WITH AURORAL AND SOLAR EVENTS WERE STUDIED. AN INDEX OF
OPERATION TIMES AND LOCATIONS FOR THIS EXPERIMENT IS AVAILABLE
IN DATA SET 65-098A-00C.

----- ALOUETTE 2, WHITTEKER -----

EXPERIMENT NAME- SWEEP FREQUENCY SOUNDER

NSSDC ID- 65-098A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/01/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.H. WHITTEKERCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

OI - J.E. JACKSONNASA-GSFC
GREENBELT, MD
OI - J.W. KINGAPPL TON LAD
SLOUGH, DUCKS, ENGLAND
OI - L. COLINNASA-ARC
MOFFETT FIELD, CA
OI - J. TURNERAUST DEPT OF INTERIOR
SYDNEY, AUSTRALIA
OI - C. TAIEDCNET
PARIS, FRANCE
OI - D. HOLTAURORAL OBS
TROMSO, NORWAY
OI - G.L. NELMSCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - Y. OGATARADIO RESEARCH LAB
TOKYO, JAPAN
OI - R. RAGHAVARAOPHYSICAL RESEARCH LAB
AHMEDABAD, INDIA
OI - E.S. WARRENCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - G.E.K. LUCKWOODCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THE SWEEP FREQUENCY IONOSONDE WAS A RADIO
TRANSMITTER/RECEIVER THAT RECORDED THE TIME DELAY BETWEEN A
TRANSMITTED AND RETURNED RADIO FREQUENCY PULSE. A CONTINUUM OF
FREQUENCIES BETWEEN 0.12 AND 14.5 MHZ WERE SAMPLED ONCE EVERY
32 SEC. A MULTIPLICITY OF DELAY TIMES WAS USUALLY OBSERVED DUE
TO BIREFRINGENCE OF THE IONOSPHERE, NON-VERTICAL PROPAGATION,
GROUND ECHOES, PLASMA RESONANCES, ETC. DELAY TIME WAS
PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE SIGNAL.
ELECTRON DENSITY ALONG THE PROPAGATION PATH, AND MODE OF
PROPAGATION. THE STANDARD DATA FORM IS AN IONOGRAM (GRAPH)
SHOWING DELAY TIME (VIRTUAL DISTANCE OF SIGNAL REFLECTION FROM
THE SATELLITE) VERSUS FREQUENCY. TWO OTHER COMMON FORMS OF
DATA WERE PREPARED FROM THE IONOGRAMS. THEY ARE DIGITAL
FREQUENCY AND/OR VIRTUAL HEIGHT VALUES OF CHARACTERISTIC
IONOSPHERIC FEATURES AND COMPUTATIONS OF ELECTRON DENSITY
PROFILES. PERFORMANCE WAS EXCELLENT. INITIALLY, ABOUT 7-1/2 HR
OF OBSERVATIONS PER DAY WERE RECORDED. IN FEBRUARY 1973, ABOUT
1 HR PER DAY WAS BEING RECORDED. AN INDEX OF OPERATION TIMES
AND LOCATIONS FOR THIS EXPERIMENT IS AVAILABLE IN DATA SET
65-098A-00C.

***** AMP3 *****

SPACECRAFT COMMON NAME- AMP3
ALTERNATE NAMES- SPACELAB AMP3 MODULE
NSSDC ID- AMP3

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- STUDY SPACECRAFT WEIGHT- KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES

LAUNCH VEHICLE- SHUTTLE

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OS5

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN
PERIAPSIS- KM ALT INCLINATION- DEG
APOAPSIS- KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.H. WAITENASA-MSFC
HUNTSVILLE, AL
PS - C.R. CHAPPELNASA-MSFC
HUNTSVILLE, AL

SPACECRAFT BRIEF DESCRIPTION

AMP3, AN ACRONYM FOR ATMOSPHERE, MAGNETOSPHERE, AND
PLASMA-IN-SPACE, REFERS TO A SERIES OF SHUTTLE/SPACELAB
MODULES CURRENTLY UNDER STUDY. A SCIENCE DEFINITION WORKING
GROUP FOR THE STUDY HAS BEEN FORMED. WITH ATMOSPHERIC SCIENCE,
WAVE PHENOMENA, TRACER AND CHEMISTRY, AND PARTICLE INTERACTION
SECTIONS. IT IS INTENDED THAT COORDINATED MEASUREMENTS
YIELDING INSIGHT ON THE ATMOSPHERE, IONOSPHERE, AND
MAGNETOSPHERE AND THEIR INTERRELATIONSHIPS WILL BE REALIZED.

***** ANS *****

SPACECRAFT COMMON NAME- ANS
ALTERNATE NAMES- ASTRO NETHERLAND SAT.
NSSDC ID- 74-070A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/30/74.

LAUNCH DATE- 08/30/74 SPACECRAFT WEIGHT- 129.8 KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
NETHERLANDS NIVR
UNITED STATES NASA-OS5

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 08/31/74
ORBIT PERIOD- 99. MIN INCLINATION- 98.1 DEG
PERIAPSIS- 254. KM ALT APOAPSIS- 1167. KM ALT

RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 08/31/74
ORBIT PERIOD- 99. MIN INCLINATION- 98.1 DEG
PERIAPSIS- 254. KM ALT APOAPSIS- 1167. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - H. BLOEMENDALFOKKER AIRCRAFT CO
SCHIPHOL EAST, NETHERLANDS

PS - E.W. HYMNOWITZNASA-GSFC
GREENBELT, MD
PS - T.P. STECHERNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE ASTRONOMICAL NETHERLANDS SATELLITE (ANS) WAS AN
EARTH-ORBITING SUN-SYNCHRONOUS SATELLITE, DESIGNED FOR USE AS
AN ASTRONOMICAL OBSERVATORY. THE SPACECRAFT HAD A
NEAR-CIRCULAR ORBIT AND WAS ATTITUDE-CONTROLLED BY MAGNETIC
COILS, REACTION WHEELS, AND A VO-YO. ATTITUDE SENSING WAS
CARRIED OUT BY SOLAR SENSORS, HORIZON SENSORS, AND STAR
SENSORS. TWO GUIDE STARS NEAR THE OBJECT BEING OBSERVED SERVED
AS THE FINAL POINTING REFERENCES. EXPERIMENTS ON BOARD
OBSERVED CELESTIAL OBJECTS IN UV AND X-RAY WAVELENGTHS.

----- ANS, BRINKMAN -----

EXPERIMENT NAME- LOW-ENERGY X-RAY EXPERIMENT

NSSDC ID- 74-070A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/30/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - A.C. BRINKMANSPACELAB RESEARCH LAB
UTRECHT, NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A MYLAR-WINDOW PROPORTIONAL
COUNTER (44- TO 55-A PASSBAND), LOCATED AT THE FOCUS OF A
GRAZING INCIDENCE RING PARABOLIC TELESCOPE, AND A
TITANIUM-WINDOW PROPORTIONAL COUNTER (PASSBANDS OF 27- TO
35-A, 4- TO 12-A, AND 2- TO 4-A) LOCATED BEHIND A MONEYGOND
COLLIMATOR. THE EXPERIMENT, WHICH OBSERVED X RAYS FROM COSMIC
SOURCES, REQUIRED AN INSTRUMENT POINTING ACCURACY OF 0.1 DEG.

***** ANS, GURSKY *****

EXPERIMENT NAME- HIGH ANGULAR AND SPECTRAL RESOLUTION
OBSERVATIONS OF COSMIC X-RAY SOURCES

NSSDC ID- 74-070A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/30/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - H. GURSKYHARVARD COLLEGE OBS
CAMBRIDGE, MA
OI - H. SCHNOPPERMASS INST OF TECH
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO OBSERVE HARD X RAYS FROM COSMIC SOURCES IN THE 2- TO 40-KEV ENERGY REGION. THE INSTRUMENTS CONSIST OF TWO BERYLLIUM-WINDOWED PROPORTIONAL COUNTERS AND A TWO-CRYSTAL DRAGG SPECTROMETER MOUNTED OUTSIDE THE CENTRAL SQUARE TUBE NEAR THE TOP OF THE SATELLITE. THE PROPORTIONAL COUNTERS EACH HAD AN APPROXIMATELY 100-CM SQ COLLECTING AREA AND AN ANGULAR RESOLUTION OF PLUS OR MINUS 6 ARC-MIN. THE CRYSTAL SPECTROMETERS POINTED WITH PLUS OR MINUS 1 ARC-MIN ANGULAR RESOLUTION. THE DETECTION LIMITS FOR THE PROPORTIONAL COUNTERS WERE ABOUT 3 X 10 TO THE MINUS THREE PHOTONS/50-CM-SQC (OR ABOUT 3 X 10 TO THE MINUS FIVE TIMES THE OBSERVED FLUX OF SCORPIUS X-1). THE DRAGG SPECTROMETER DETECTED X-RAY EMISSIONS OF GREATER THAN 1 PERCENT IRON IN A SOURCE 0.01 OF SCORPIUS X-1.

----- AMS, VANDUIMFN -----

EXPERIMENT NAME- UV TELESCOPE

NSSDC ID- 74-070A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 00/30/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.J. VANDUIMFNKAPTEYN OBS
RODEN, NETHERLANDS
OI - J. BORGMANU OF GRONINGEN
RODEN, NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, WHICH REQUIRED A POINTING ACCURACY OF 1 ARC-MIN, CONSISTED OF A SMALL CASSEGRAIN TELESCOPE COUPLED TO A GRATING SPECTROGRAPH. THE SPECTROGRAPH COVERED FIVE WAVELENGTH BANDS BETWEEN 1500 AND 3295 Å. USING PHOTOMULTIPLIERS AS DETECTORS, THE EXPERIMENT IS DESIGNED TO BE SENSITIVE ENOUGH TO OBSERVE STARS UP TO THE 10TH MAGNITUDE.

***** APOLLO 12 LM/ALSEP *****

SPACECRAFT COMMON NAME- APOLLO 12 LM/ALSEP
ALTERNATE NAMES- 34246, ALSEP 12
LEM 12, APOLLO 12C

NSSDC ID- 69-099C

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 11/19/69.

LAUNCH DATE- 11/14/69 SPACECRAFT WEIGHT- 4379. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- SATURN 5

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DNSF
UNITED STATES NASA-DSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - W.F. FICHELMANNASA-JSC
HOUSTON, TX

SPACECRAFT BRIEF DESCRIPTION

THE LUNAR MODULE (LM) WAS A TWO-STAGE VEHICLE DESIGNED FOR SPACE OPERATIONS NEAR AND ON THE MOON. THE LM STOOD 7 M HIGH AND WAS 9.4 M WIDE (DIAGONALLY ACROSS THE LANDING GEAR). THE ASCENT AND DESCENT STAGES OF THE LM OPERATED AS A UNIT UNTIL STAGING. WHEN THE ASCENT STAGE FUNCTIONED AS A SINGLE SPACECRAFT FOR RENDEZVOUS AND DOCKING WITH THE COMMAND MODULE (CM). THE ALSEP EXPERIMENTS INCLUDED (1) THE PASSIVE SEISMOGRAPH, WHICH WAS DESIGNED TO MEASURE SEISMIC ACTIVITY AND PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR, (2) THE SUPRATHERMAL ION DETECTOR, DESIGNED TO MEASURE THE FLUX COMPOSITION, ENERGY, AND VELOCITY OF LOW-ENERGY POSITIVE IONS, (3) THE COLD CATHODE ION GAUGE, DESIGNED TO MEASURE THE ATMOSPHERE AND ANY VARIATIONS WITH TIME OR SOLAR ACTIVITY SUCH AS THE LUNAR ATMOSPHERE MAY HAVE, (4) THE CHARGED PARTICLE LUNAR ENVIRONMENT EXPERIMENT, DESIGNED TO MEASURE PARTICLE ENERGIES OF SOLAR PROTONS AND ELECTRONS THAT REACH THE LUNAR SURFACE AND TO PROVIDE DATA ON ENERGY DISTRIBUTION OF THESE SOLAR PARTICLES, (5) THE LUNAR SURFACE MAGNETOMETER (LSM), DESIGNED TO MEASURE THE MAGNETIC FIELD AT THE LUNAR SURFACE, AND (6) THE SOLAR WIND SPECTROMETER, WHICH MEASURED THE FLUXES AND SPECTRA OF THE ELECTRONS AND PHOTONS THAT EMANATE FROM THE SUN AND REACH THE LUNAR SURFACE.

----- APOLLO 12 LM/ALSEP, FREEMAN -----

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR

NSSDC ID- 69-099C-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/10/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.W. FREEMANRICE U
HOUSTON, TX
OI - F.C. MICHELRICE U
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, WHICH WAS PART OF THE ALSEP PACKAGE, STUDIED THE IONIC ENVIRONMENT OF THE MOON BY DETECTING FREE STREAMING AND THERMALIZED SOLAR WIND IONS AND THOSE IONS WHICH RESULT FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE. A LOW-ENERGY CURVED PLATE ANALYZER, WITH A VELOCITY FILTER OF CROSSED ELECTRIC AND MAGNETIC FIELDS, DETERMINED THE PARTICLE FLUX IN SELECTED INTERVALS OVER THE RANGE 0.2 TO 48.6 EV PER UNIT CHARGE, WITH SPECIES DISCRIMINATION OF MASSES UP TO 1000 AMU. ANOTHER ANALYZER WITHOUT A VELOCITY FILTER DETECTED HIGHER-ENERGY PARTICLES SUCH AS THOSE FOUND IN SELECTED ENERGY INTERVALS BETWEEN 10 AND 3500 EV. DUE TO ITS ORIENTATION, THIS INSTRUMENT DID NOT OBSERVE SOLAR WIND PARTICLES EXCEPT IN THE SHEATH AND TAIL. HOWEVER, IT DID SEE UPSTREAMING PARTICLES, ETC., FROM THE SHOCK. HIGH-VOLTAGE POWER SUPPLY ARCING CAUSED SOME LOSS OF DATA. AFTER MARCH 18, 1970, THE INSTRUMENT WAS NOT OPERATED WHEN SENSOR TEMPERATURE EXCEEDED 85 DEG. C.

----- APOLLO 12 LM/ALSEP, LATHAM -----

EXPERIMENT NAME- PASSIVE SEISMIC

NSSDC ID- 69-099C-03

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 11/19/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G.V. LATHAMU OF TEXAS, GALVESTON
GALVESTON, TX
OI - F. PRESSMASS INST OF TECH
CAMBRIDGE, MA
OI - G. SUTTONU OF HAWAII
HONOLULU, HI

EXPERIMENT BRIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE) WAS PLACED ON THE LUNAR SURFACE AS PART OF THE ALSEP PACKAGE. IT WAS LOCATED AND DEPLOYED 310 FT (100 M) FROM THE LM IN THE VICINITY OF SURVEYOR 3. THE SEISMOGRAPH EXPERIMENT MEASURED SEISMIC ACTIVITY OF THE MOON AND OBTAINED INFORMATION ON THE PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR. THE PSE DETECTED SURFACE TILT PRODUCED BY TIDAL DEFORMATIONS, MOONQUAKES, AND METEORITE IMPACTS. IT WAS NUCLEAR POWERED (SNAP-27) AND COULD OPERATE CONTINUOUSLY. THE COMPONENTS WERE A SENSOR ASSEMBLY, LEVELING STUOL, THERMAL SHROUD, AND RADIOISOTOPE HEATERS. READINGS FROM THE SENSORS WERE SENT TO THE ALSEP CENTRAL STATION WHICH TRANSMITTED THE DATA BACK TO EARTH.

----- APOLLO 12 LM/ALSEP, SNYDER -----

EXPERIMENT NAME- SOLAR WIND SPECTROMETER

NSSDC ID- 69-099C-02

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 11/05/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.W. SNYDERNASA-JPL
PASADENA, CA
OI - D.R. CLAYNASA-JPL
PASADENA, CA
OI - M.H. NEUGEBAUERNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE SOLAR WIND SPECTROMETER WAS PART OF THE APOLLO 12 ALSEP PACKAGE LEFT ON THE LUNAR SURFACE. IT CONSISTED OF SEVEN MODULATED FARADAY CUPS ORIENTED TOWARD DIFFERENT, BUT SLIGHTLY OVERLAPPING, PORTIONS OF THE LUNAR SKY. THE INSTRUMENT WAS USED TO OBSERVE THE DIRECTIONAL INTENSITIES OF THE ELECTRON (6-1330 EV) AND POSITIVE ION (10-9700 EV) COMPONENTS OF THE SOLAR WIND AND MAGNETOTAIL PLASMA THAT STRIKE THE SURFACE OF THE MOON. THE SOLAR WIND SPECTROMETER OPERATED WELL FROM TURN-ON UNTIL NOVEMBER 9, 1971, WHEN TROUBLE WAS ENCOUNTERED IN TWO OF THE SPECTRAL ENERGY LEVELS.

***** APOLLO 14 LM/ALSEP *****

SPACECRAFT COMMON NAME- APOLLO 14 LM/ALSEP
ALTERNATE NAMES- ALSEP 14, LEM 14
34905, APOLLO 14C

NSSDC ID- 71-006C

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 02/05/71.

LAUNCH DATE- 01/31/71 SPACECRAFT WEIGHT- 4857. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- SATURN 5

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DNSF
UNITED STATES NASA-DSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - W.F. FICHELMANNASA-JSC
HOUSTON, TX

SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 14 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT AND AN APOLLO LUNAR SURFACE EXPERIMENT PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE LUNAR SURFACE AFTER COMPLETION OF THE MANNED PORTION OF

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

THE MISSION. THE LM LANDED IN THE LUNAR HIGHLANDS (3 DEG 39 MIN N 1 SEC 5 LATITUDE, 17 DEG 27 MIN 55 SEC W LONGITUDE). THE NUCLEAR POWERED ALSEP WAS DEPLOYED AT THE LANDING SITE AND INCLUDED EXPERIMENTS TO STUDY THE SEISMIC WAVES, MAGNETIC FIELDS, SOLAR WIND COMPOSITION AND INTERACTION WITH THE MOON, LUNAR ATMOSPHERE, AND IONIC ENVIRONMENT.

----- APOLLO 14 LM/ALSEP, FREEMAN -----

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR

NSSDC ID- 71-000C-06

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/29/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.W. FREEMANRICE U

OI - F.C. MICHELRICE U

HOUSTON, TX

HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE ALSEP SUPRATHERMAL ION DETECTOR EXPERIMENT MEASURED IONS GENERATED FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE AND THE FLOW-STREAMING SOLAR WIND/LUNAR SURFACE INTERACTION. FROM THE DATA OBTAINED, FLUX, NUMBER DENSITY, VELOCITY, AND ENERGY PER UNIT CHARGE CAN BE DETERMINED. A CURVED PLATE ANALYZER AND AN E-CROSS-D VLOCITY SELECTOR DETECTED IONS WITH NORMAL VELOCITIES FROM 0.4 TO 93.5 KM/SEC AND ENERGIES FROM 0.2 TO 40.6 EV, ENABLING SPECIES DISCRIMINATION OF HASSES UP TO 750 AMU. A SEPARATE CURVED PLATE ANALYZER COUNTED PROTONS IN SELECTED ENERGY INTERVALS FROM 10 TO 3500 EV. DUE TO THE ORIENTATION OF THESE DIRECTIONAL INSTRUMENTS, SOLAR WIND IONS WERE NOT OBSERVED DIRECTLY EXCEPT IN THE TAILWARD SHEATH. HOWEVER, IONS FROM THE DOW SHOCK WERE OBSERVED. ON APRIL 5, 1971 SOME ENGINEERING DATA WERE LOST DUE TO THE PARTIAL FAILURE OF AN ANALOG-TO-DIGITAL CONVERTER. THE EXPERIMENT RETURNED GOOD CONTINUOUS SCIENTIFIC DATA UNTIL OCTOBER 20, 1971 WHEN A SCING IN THE HIGH-VOLTAGE POWER SUPPLY LIMITED OPERATION NEAR LUNAR NOON. AFTER OCTOBER 16, 1971 OPERATION WAS DISCONTINUED WHEN INSTRUMENT TEMPERATURE EXCEEDED 85 DEG C. ALL DATA TAKEN AFTER MARCH 29, 1972 WERE TAKEN IN AN ANOMALOUS STANDBY MODE, AND DATA COVERAGE WAS VERY POOR.

----- APOLLO 14 LM/ALSEP, JOHNSON -----

EXPERIMENT NAME- COLD CATHODE ION GAUGE EXPERIMENT

NSSDC ID- 71-000C-07

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 04/ 3/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER

OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.S. JOHNSONU OF TEXAS, DALLAS

OI - D.E. EVANSNASA-JSC

HOUSTON, TX

HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE ALSEP COLD CATHODE GAUGE EXPERIMENT DETERMINED PRESSURES FROM 1E-6 TO 1E-12 TORR OF THE AMBIENT LUNAR ATMOSPHERE. THE RESULTS OF THIS EXPERIMENT, COMBINED WITH THOSE OF THE SUPRATHERMAL ION DETECTOR, WERE USED TO MEASURE THE DENSITY AND PRESSURE OF THE LUNAR NEUTRAL ATMOSPHERE. ON APRIL 5, 1971, SOME ENGINEERING DATA WERE LOST DUE TO THE PARTIAL FAILURE OF AN A/D CONVERTER. NOISEY AND ERRATIC NIGHT-TIME OPERATION BEGAN IN FEBRUARY 1972, AND CONTINUED UNTIL NOVEMBER 1972 WHEN NIGHT-TIME DATA WERE LOST. OPERATION CONTINUED WITH LITTLE OR NO NIGHT-TIME COVERAGE UNTIL APRIL 15, 1973, WHEN THE EXPERIMENT ANOMALOUSLY WENT INTO STANDBY CONDITION. LITTLE USABLE DATA ARE EXPECTED AFTER APRIL 15, 1973.

----- APOLLO 14 LM/ALSEP, KOVACH -----

EXPERIMENT NAME- ACTIVE SEISMIC

NSSDC ID- 71-000C-05

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 12/07/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.L. KOVACHSTANFORD U

OI - J.S. WATKINSU OF TEXAS, GALVESTON

GALVESTON, TX

GALVESTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO GENERATE AND MONITOR SEISMIC WAVES IN THE MOON NEAR THE SURFACE IN ORDER TO STUDY THE INTERNAL STRUCTURE TO A DEPTH OF 460 M. THE SEISMIC ENERGY SOURCE USED WAS THE THUMPER DEVICE, WHICH CONTAINED 21 SMALL EXPLOSIVE CHARGES. THE THUMPER PACKAGE CONTAINING FOUR HIGH-EXPLOSIVE GRENADES WAS PLANTED, BUT ITS DETONATION FROM EARTH WAS POSTPONED UNTIL THE OTHER EXPERIMENTS WERE COMPLETED TO AVOID DAMAGING THEM. THE THUMPER DEVICE PROVIDED DATA THAT INDICATED THAT TWO P-WAVE VELOCITIES WERE MEASURED AT THE FRA MAURO SITE. THE NEAR SURFACE HAS A SEISMIC WAVE VELOCITY OF 104 M/SEC, AND A SUBLAYER STARTING AT A DEPTH OF 8.5 M HAS A VELOCITY OF 299 M/SEC. ESTIMATES OF THE THICKNESS OF THIS

SUBSTRATUM RANGE FROM 30 TO 76 M, WHICH IS PROBABLY INDICATIVE OF THE DEPTH OF THE FRA MAURO FORMATION. THE EQUIPMENT CONSISTED OF A STAFF WITH THE CHARGE INITIATORS MOUNTED ON THE LOWER END OF ITS BASE, A CABLE CONNECTING THE STAFF (THUMPER) TO THE CENTRAL STATION, GEOPHONES (MINIATURE SEISMOMETERS) FOR RECORDING THE WAVES, AND A THREE-CHANNEL AMPLIFIER WITH LOG COMPRESSOR FOR TELEMETERING THE DATA.

----- APOLLO 14 LM/ALSEP, LATHAN -----

EXPERIMENT NAME- PASSIVE SEISMIC

NSSDC ID- 71-000C-04

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/20/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.V. LATHANU OF TEXAS, GALVESTON

OI - W.M. FRIEDCOLUMBIA U

NEW YORK, NY

OI - F. PRESSMASS INST OF TECH

CAMBRIDGE, MA

OI - G. SUTTONU OF HAWAII

HONOLULU, HI

EXPERIMENT BRIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE) WAS PLACED ON THE LUNAR SURFACE AS PART OF THE ALSEP. IT WAS LOCATED AND DEPLOYED 98 M FROM THE LM. THIS EXPERIMENT WAS DESIGNED TO MEASURE SEISMIC ACTIVITY OF THE MOON AND TO OBTAIN INFORMATION ON THE PHYSICAL PROPERTIES OF THE LUNAR CRUST AND INTERIOR. THE PSE WAS ALSO DESIGNED TO DETECT SURFACE TILT PRODUCED BY TIDAL DEFORMATIONS, MOONQUAKES, AND METEORITE IMPACTS. THE EXPERIMENT WAS NUCLEAR POWERED (SNAP-27) AND COULD OPERATE CONTINUOUSLY. THE COMPONENTS WERE THE SENSOR ASSEMBLY, THE LEVELING STOOL, THE THERMAL SHROUD, AND THE RADIOISOTOPE HEATERS. READINGS FROM THE SENSORS WERE SENT TO THE ALSEP CENTRAL STATION, WHICH TRANSMITTED THE DATA BACK TO EARTH. INFORMATION ABOUT THE INTERIOR TO DEPTHS OF APPROXIMATELY 100 KM HAVE BEEN OBTAINED FROM THIS SEISMOMETER AND FROM THE APOLLO 11 MISSION SEISMOMETER LEFT ON THE MOON AT TRANQUILITY BASE.

----- APOLLO 14 LM/ALSEP, O'BRIEN -----

EXPERIMENT NAME- CHARGED PARTICLE LUNAR ENVIRONMENT

NSSDC ID- 71-000C-08

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 06/06/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - U.J. O'BRIENDEPT OF ENVIRON PROT

PERTH, AUSTRALIA

OI - D.L. REASONERRICE U

HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRA OF LOW-ENERGY CHARGED PARTICLES STRIKING THE LUNAR SURFACE. THE MAIN PART OF THE INSTRUMENTATION CONSISTED OF TWO ELECTROSTATIC ANALYZERS. ONE OF THESE POINTED TOWARD LOCAL LUNAR VERTICAL, AND THE OTHER TO A POINT 60 DEG FROM VERTICAL TOWARD LUNAR WEST. AS A FIRST APPROXIMATION, BOTH DETECTORS COULD BE CONSIDERED TO POINT IN THE ECLIPTIC PLANE. EACH ANALYZER CONSISTED OF A SET OF DIRECTION-DEFINING SLITS, DEFLECTION PLATES, FIVE SMALL-APERTURE C-SHAPED CHANNEL ELECTRON MULTIPLIERS, AND ONE LARGE-APERTURE CHANNEL ELECTRON MULTIPLIER. FOR A GIVEN APPLIED DEFLECTION VOLTAGE, THE FIVE MULTIPLIERS WERE ARRANGED TO COUNT PARTICLES OF ONE POLARITY WITH DIFFERING ENERGIES, WHILE THE LARGE-APERTURE MULTIPLIER MADE A WIDE-BAND MEASUREMENT OF PARTICLES OF THE OPPOSITE POLARITY. DURING EACH 19.2-SEC INTERVAL IN THE AUTOMATIC MODE OF EXPERIMENT OPERATION, DEFLECTION VOLTAGES OF ZERO (TWICE) AND PLUS AND MINUS 35, 350, AND 3500 WERE APPLIED TO THE DEFLECTION PLATES OF BOTH ANALYZERS FOR 2.4 SEC EACH VOLTAGE. THE LITTLE-USED MANUAL MODE PERMITTED THE CONTINUOUS APPLICATION OF A SINGLE DEFLECTION VOLTAGE, THUS INCREASING TEMPORAL RESOLUTION FOR PARTICLES IN A LIMITED PORTION OF THE SPECTRUM. USEFUL DATA OBTAINED DURING EACH 19.2-SEC INTERVAL (AUTOMATIC MODE) WERE, FOR EACH ANALYZER, 1.2-SEC ACCUMULATED COUNTS OF ELECTRONS IN 10 ENERGY WINDOWS BETWEEN 40 EV AND 20 KEV, AND IONS IN 12 ENERGY WINDOWS BETWEEN 2.17 AND 20 KEV. THE EXPERIMENT WORKED NORMALLY FROM DEPLOYMENT (FEB. 5, 1971) UNTIL APRIL 8, 1971 WHEN THE ANALYZER POINTING AWAY FROM LUNAR VERTICAL FAILED. THE OTHER ANALYZER CONTINUED TO FUNCTION NORMALLY UNTIL JUNE 6, 1971 WHEN A PARTIAL FAILURE OCCURRED. OPERATION OF THIS ANALYZER WAS INTERMITTENT FOR THE REST OF 1971. DURING MOST OF 1972, OPERATION WAS CONTINUOUS DURING LUNAR NIGHT AND INTERMITTENT DURING LUNAR DAY. FROM DECEMBER 1972 TO FEBRUARY 1973 OPERATION WAS CONTINUOUS, AFTER WHICH TIME THE HIGH VOLTAGE PROBLEMS OCCURRED AGAIN.

***** APOLLO 15 LM/ALSEP *****

SPACECRAFT COMMON NAME- APOLLO 15 LM/ALSEP

ALTERNATE NAMES- APOLLO 15C, ALSEP 15

LEM 15, ROYER 15

05366

NSSDC ID- 71-063C

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/30/71.

LAUNCH DATE- 07/26/71 SPACECRAFT WEIGHT- 12700. KG
LAUNCH SITE- CANF CANAVERAL, UNITED STATES
LAUNCH VEHICLE- SATURN 5

SPONSORING COUNTRY/AGENCY
UNITED STATES
UNITED STATES

NASA-DVSP
NASA-DSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - W.F. FICHELMANNASA-JSC
HOUSTON, TX

SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 15 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, A LUNAR ROVING VEHICLE (LRV), AND AN APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE MOON AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE NORTH CENTRAL PART OF THE MOON (26 DEG 4 MIN 54 SEC N LATITUDE, 3 DEG 39 MIN 30 SEC E LONGITUDE). AT THE FOOT OF THE APENNINE MOUNTAIN RANGE, THE ALSEP WAS DEPLOYED AT THE LANDING SITE. THE LRV WAS USED DURING THE EXTRAVEHICULAR ACTIVITIES (EVA) TO EXTEND THE RANGE OF MANNED LUNAR EXPLORATION. THE NUCLEAR-POWERED ALSEP CONTAINED SEISMIC, MAGNETIC FIELDS, LUNAR ATMOSPHERIC COMPOSITION, ION COMPOSITION, LUNAR DUST, SOLAR WIND COMPOSITION, HEAT LOSS, AND SOLAR CELL RADIATION DAMAGE EXPERIMENTS.

----- APOLLO 15 LM/ALSEP, BATES -----

EXPERIMENT NAME- LUNAR DUST DETECTOR

NSSDC ID- 71-063C-09

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/31/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.R. BATESNASA-JSC
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE FUNCTION OF THE ALSEP LUNAR DUST DETECTOR EXPERIMENT WAS TO SEPARATE AND MEASURE HIGH-ENERGY RADIATION DAMAGE TO THREE SOLAR CELLS, TO MEASURE REDUCED SOLAR CELL OUTPUT DUE TO DUST ACCUMULATION, AND TO MEASURE REFLECTED INFRARED ENERGY AND TEMPERATURES FOR USE IN COMPUTING LUNAR SURFACE TEMPERATURES. THE DUST DETECTOR HAD TWO COMPONENTS -- SENSOR PACKAGE MOUNTED TO THE TOP OF THE CENTRAL STATION SUN SHIELD, AND A PRINTED CIRCUIT BOARD LOCATED WITHIN THE CENTRAL STATION THAT INTERFACED WITH THE POWER DISTRIBUTION UNIT OF THE ALSEP DATA SUBSYSTEM. THE EXPERIMENT WAS SIMILAR TO THAT DEPLOYED ON APOLLO 12 AND 14.

----- APOLLO 15 LM/ALSEP, FREEMAN -----

EXPERIMENT NAME- SUPRATHERMAL ION DETECTOR

NSSDC ID- 71-063C-05

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 09/13/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.W. FREEMANPICE U
HOUSTON, TX

OI - F.C. MICHELPICE U
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE ALSEP SUPRATHERMAL ION DETECTOR EXPERIMENT MEASURED IONS GENERATED FROM ULTRAVIOLET IONIZATION OF THE LUNAR ATMOSPHERE AND FROM THE FREE STREAMING SOLAR WIND/LUNAR SURFACE INTERACTION. FLUX, NUMBER DENSITY, VELOCITY, AND ENERGY PER UNIT CHARGE WERE DETERMINED FROM THE DATA OBTAINED. A CURVED PLATE ANALYZER AND A CROSS B VELOCITY SELECTOR DETECTED IONS WITH NORMAL VELOCITIES FROM 0.4 TO 93.5 KM/SEC AND ENERGIES FROM 0.2 TO 48.6 EV. SPECIES DISCRIMINATION OF MASSES UP TO 120 AMU WAS POSSIBLE. A SEPARATE CURVED PLATE ANALYZER COUNTED SOLAR WIND PROTONS IN SELECTED ENERGY INTERVALS FROM 10 TO 3500 EV. OPERATION WAS NORMAL UNTIL LUNAR NOON ON DECEMBER 16, 1971, WHEN SENSOR TEMPERATURE EXCEEDED 85 DEG C. OPERATION WAS CURTAILED DUE TO POWER SUPPLY ARCING. DATA FROM OTHER PERIODS OF OPERATION WERE NORMAL.

----- APOLLO 15 LM/ALSEP, JOHNSON -----

EXPERIMENT NAME- COLD CATHODE ION GAUGE EXPERIMENT

NSSDC ID- 71-063C-07

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/22/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.S. JOHNSONNASA-JSC
DALLAS, TX

OI - D.E. EVANSNASA-JSC
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE ALSEP COLD CATHODE GAUGE EXPERIMENT WAS DESIGNED TO MEASURE THE DENSITY OF NEUTRAL ATOMS AND TO DETERMINE PRESSURES OF THE AMBIENT LUNAR ATMOSPHERE FROM 1E-6 TO 1E-12 TORR. THE DATA ARE TO COMPLEMENT MEASUREMENTS MADE BY THE ALSEP SUPRATHERMAL ION DETECTOR. THE INSTRUMENT WAS NOT OPERATED FOR PROLONGED PERIODS DURING THE LUNAR DAY BECAUSE OF VOLTAGE RESTRICTIONS PLACED ON THE HIGH-VOLTAGE POWER SUPPLY IN THE SIDE PACKAGE. HOWEVER, SUFFICIENT DAYSIDE OPERATION WAS CARRIED OUT OVER THE INSTRUMENT LIFETIME TO ALLOW CONSTRUCTION OF THE AVERAGE DAYSIDE DENSITY AND PRESSURE PROFILES.

----- APOLLO 15 LM/ALSEP, LANGSETH -----

EXPERIMENT NAME- HEAT FLOW

NSSDC ID- 71-063C-06

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 08/07/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - M.G. LANGSETHLAMONT-DOHERTY GEO OBS
PALISADES, NY

OI - S.P. CLARK, JR.YALE U
NEW HAVEN, CT

EXPERIMENT BRIEF DESCRIPTION

THE HEAT FLOW EXPERIMENT (HFE), WHICH WAS PART OF THE ALSEP, WAS DESIGNED TO DETERMINE THE RATE OF HEAT LOSS FROM THE LUNAR INTERIOR. THE EXPERIMENT DETECTED LUNAR TEMPERATURES OF THE FOLLOWING TYPES AND RANGES, WITH CORRESPONDING ACCURACIES NOTED IN PARENTHESES -- HIGH-SENSITIVITY MEASUREMENTS OF PLUS OR MINUS 2 DEG C (10-003 DEG C) TEMPERATURE DIFFERENCE, LOW-SENSITIVITY DIFFERENCE, PROBE OR MINUS 20 DEG C (10-03 DEG C) TEMPERATURE DIFFERENCE, PROBE AMBIENT TEMPERATURES FROM 200 DEG K TO 250 DEG K (10-1 DEG K), THERMOCOUPLE REFERENCE TEMPERATURE FROM -20 DEG C TO -60 DEG C (10-1 DEG C), AND PROBE CABLE AMBIENT TEMPERATURES FROM 90 DEG K TO 250 DEG K (10-3 DEG K). THE INSTRUMENTATION CONSISTED OF TWO 1.2-M PROBES THAT WERE INSERTED INTO THE LUNAR SURFACE, A SPECIAL TOOL FOR PROBE INSERTION, AND AN ELECTRONICS PACKAGE THAT WAS CABLE-CONNECTED TO THE PROBES AND THE CENTRAL STATION. TO ENABLE PLACEMENT OF THE PROBES INTO THE LUNAR SURFACE, TWO 3-M HOLES WERE DRILLED IN THE SURFACE BY ASTRONAUT SCOTT USING THE APOLLO LUNAR SURFACE DRILL (ALSD). THE ALSD WAS EQUIPPED WITH CORE STEM CAPS AND RETAINERS, CORE STEMS, CORE BITS, A CORE BIT/DRILL ADAPTER, A TREADLE, AND A CORE STEM/CORE STEM WRENCH. THE CORE STEM ASSEMBLIES USED IN DRILLING REMAINED IN THE HOLES TO PROVIDE A CASING TO PREVENT COLLAPSE OF THE HOLE WALLS DURING INSERTION OF THE PROBES. PRELIMINARY RESULTS OF THE EXPERIMENT INDICATE A LUNAR HEAT FLOW OF 3.3E-6 W/CM SQ, WHICH IS ONE-HALF THAT OF THE EARTH. THE RATE OF TEMPERATURE INCREASE AS A FUNCTION OF DEPTH IS 1.75 DEG K PER M. TEMPERATURE MEASUREMENTS WERE ALSO OBTAINED DURING LUNAR NIGHT AND DURING A TOTAL ECLIPSE ON AUGUST 6, 1971.

----- APOLLO 15 LM/ALSEP, LATHAM -----

EXPERIMENT NAME- PASSIVE SEISMIC

NSSDC ID- 71-063C-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/31/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.V. LATHAMU OF TEXAS, GALVESTON
GALVESTON, TX

OI - W.H. EWINGCOLUMBIA U
NEW YORK, NY

OI - F. PRESSMASS INST OF TECH
CAMBRIDGE, MA

OI - G. SUTTONU OF HAWAII
HONOLULU, HI

EXPERIMENT BRIEF DESCRIPTION

THE PASSIVE SEISMIC EXPERIMENT (PSE), PART OF THE APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP), MEASURED SEISMIC SIGNALS FROM BOTH EXTERNAL AND INTERNAL SOURCES OF SEISMIC ENERGY ON THE MOON. THE MEASUREMENTS OBTAINED HAVE BEEN USED TO DETERMINE THE INTERNAL STRUCTURE OF THE MOON, THE RATE OF ENERGY RELEASE, AND THE NUMBERS AND MASSES OF METEORITIDS IMPACTING THE LUNAR SURFACE. THE LUNAR SURFACE IMPACTS OF THE SPENT S-1VB AND LM ASCENT STAGES WERE USED AS EXTERNAL CALIBRATION SOURCES FOR THE SEISMOMETERS. THE KNOWN MASS AND VELOCITY OF THESE STAGES AT SURFACE IMPACT AND THE LUNAR IMPACT POINT COORDINATES ENABLED THE COMPUTATION OF ENERGY GENERATED AT IMPACT AND THE POINT OF ENERGY APPLICATION. (THE CALIBRATION CHARACTERISTICS WERE DETERMINED BY MEASURING SEISMOMETER RESPONSE TO THESE ENERGY SOURCES.) THE EXPERIMENT, WHICH WAS DEPLOYED 110 M WEST OF THE LM, CONSISTED OF TWO SEISMIC ASSEMBLIES -- A LONG PERIOD (LP) SEISMOMETER (TRIAXIAL, ORTHOGONAL) WITH A SEISMIC FREQUENCY RESPONSE FROM 0.004 TO 3 HZ (80-DB DYNAMIC RANGE) AND A SHORT PERIOD (SP) SEISMOMETER (UNIAXIAL, VERTICAL MOTION) WITH A SEISMIC FREQUENCY FROM 0.05 TO 20 HZ (80-DB DYNAMIC RANGE). THE MINIMUM DETECTABLE SIGNAL OF THE PSE SEISMOMETERS WAS 0.3 MICRON AT A FREQUENCY OF 1 HZ. THE SEISMOMETERS WERE HOUSED IN A DOME-SHAPED ENCLOSURE ROUNDED IN THE BOTTOM. THIS ENCLOSURE RESTED ON A SUPPORT STRUCTURE (STOOL) AND WAS COVERED BY A THERMAL SHROUD AFTER DEPLOYMENT OF THE EXPERIMENT. THE

SEISMOMETERS WERE OPERATING NORMALLY AS OF AUGUST 1972. THE APOLLO 15 SEISMOMETER WAS PART OF A TRIANGULAR NETWORK OF SEISMOMETERS THAT INCLUDED THE APOLLO 12 AND 14 SEISMOMETERS. (THE APOLLO 11 SEISMOMETER CEASED FUNCTIONING ABOUT 2 MONTHS AFTER DEPLOYMENT ON JULY 20, 1969.) THREE MAJOR DISCOVERIES HAVE RESULTED FROM THE SEISMOMETER EXPERIMENTS -- (1) THE EXISTENCE OF A CRUST AND MANTLE, (2) DEPTH OF FOCUS OF CYCLIC MOONQUAKES AT 600 KM, AND (3) EFFICIENT SCATTERING OF ENERGY IN A NEAR-SOURCE REGION.

***** APOLLO 16 LM/ALSEP *****

SPACECRAFT COMMON NAME- APOLLO 16 LM/ALSEP
ALTERNATE NAMES- ALSEP 16, LEM 16
REVER 16, 06095
APOLLO 16C

NSSDC ID- 72-031C

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/21/72.

LAUNCH DATE- 04/16/72 SPACECRAFT WEIGHT- 5040. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- SATURN 5

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DMSF
UNITED STATES NASA-DSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - W.F. EICHELMANNASA-JSC
HOUSTON, TX

SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 16 LUNAR MODULE (LM) CONSISTED OF A LUNAR LANDING CRAFT, A LUNAR ROVING VEHICLE (LRV), AND AN APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) THAT CONTAINED SCIENTIFIC EXPERIMENTS TO BE LEFT ON THE LUNAR SURFACE AFTER COMPLETION OF THE MANNED PORTION OF THE MISSION. THE LM LANDED IN THE DESCARTES HIGHLAND REGION JUST NORTH OF THE CRATER DOLLAND AT A DEG 59 MIN 55 SEC S LATITUDE, AND 15 DEG 31 MIN 12 SEC E LONGITUDE. THE ALSEP WAS DEPLOYED AT THE LANDING SITE. THE LRV WAS USED DURING EXTRAVEHICULAR ACTIVITIES (EVA) TO EXTEND THE RANGE OF MANNED LUNAR EXPLORATION. THE NUCLEAR-POWERED ALSEP PACKAGE CONTAINED SEISMIC, MAGNETIC FIELD, AND HEAT FLOW.

***** APOLLO 16 LM/ALSEP, DYAL *****

EXPERIMENT NAME- LUNAR SURFACE MAGNETOMETER

NSSDC ID- 72-031C-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 08/17/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P. DYALNASA-ARC
MOFFETT FIELD, CA
OI - C.V. PARKINNASA-ARC
MOFFETT FIELD, CA
OI - C.P. SONETTU OF ARIZONA
TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A TRIAXIAL FLUXGATE MAGNETOMETER AND WAS PART OF A THREE-STATION NETWORK (APOLLO 12, 15, 16) INTENDED TO YIELD INFORMATION ON THE INTERNAL ELECTROMAGNETIC CHARACTERISTICS OF THE MOON. FLIPPABLE SENSORS WERE LOCATED 75 CM ABOVE THE LUNAR SURFACE AT THE ENDS OF THREE ORTHOGONAL 100-CM BOOMS. SENSOR ORIENTATION WAS INITIALLY DETERMINED BY THE ASTRONAUTS USING A BUBBLE LEVEL AND A SHADOWGRAPH, AND HAS BEEN SUBSEQUENTLY MONITORED (WITH AN ACCURACY OF 0.2 DEGREES) BY GRAVITY-LEVEL SENSORS. EACH SENSOR COULD BE OPERATED IN THE RANGES FROM MINUS TO PLUS 50, 100, OR 200 GAMMAS, WITH A 0.1-GAMMA RESOLUTION. FREQUENCY RESPONSE WAS FROM 0 TO 3 HZ. THE EXPERIMENT FUNCTIONED NORMALLY FROM EMPLACEMENT TO JULY 24, 1972, WHEN THE SENSOR FLIP MECHANISM FAILED. THE EXPERIMENT CONTINUED IN THIS STATE UNTIL FEBRUARY 16, 1973, WHEN A LONG PERIOD OF INTERMITTENT INSTRUMENT OPERATION ENSUED. ON AUGUST 17, 1973, THE INSTRUMENT RETURNED TO A FULLY OPERATIONAL CONDITION.

***** APOLLO 16 LM/ALSEP, KOVACH *****

EXPERIMENT NAME- ACTIVE SEISMIC

NSSDC ID- 72-031C-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 12/07/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.L. KOVACHSTANFORD U
STANFORD, CA
OI - J.S. WATKINSU OF TEXAS, GALVESTON
GALVESTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE ACTIVE SEISMIC EXPERIMENT (ASE) (S-033) WAS TO ACQUIRE DATA TO DETERMINE THE PHYSICAL PROPERTIES OF THE LUNAR SURFACE AND SUBSURFACE MATERIALS, BOTH NATURAL AND ARTIFICIALLY PRODUCED SEISMIC WAVES WERE MONITORED. THE ARTIFICIAL WAVES WERE PRODUCED BY SHOTGUN-LIKE CHARGES FIRED BY A 'THUMPER' DEVICE AND EXPLOSIVE GRENADE

CHARGES FIRED FROM A MORTAR BOX ASSEMBLY BY AN ASTRONAUT. THE EQUIPMENT CONSISTED OF A THUMPER/GROPHONE ASSEMBLY, A MORTAR PACKAGE ASSEMBLY, INTERCONNECTING CABLES, AND AN ELECTRONICS ASSEMBLY MOUNTED IN THE CENTRAL STATION. THE ASE GENERATED AND MONITORED SEISMIC WAVES IN THE RANGE 3 TO 250 HZ WITH A FREQUENCY RESPONSE OF PLUS OR MINUS 3 DB IN THE FREQUENCY RANGE OF 3 TO 100 HZ. NATURAL SEISMIC WAVES WERE ALSO MONITORED WITHIN THIS RANGE WHILE THE ALSEP STATION WAS OPERATING IN THE ASE MODE. THE DATA-GATHERING INTERVAL WAS SMALL BECAUSE THE CENTRAL STATION OPERATED IN THE ASE MODE ON THE AVERAGE OF ONLY 30 MIN/WEK. THE THUMPER CONTAINED 21 STANDARD INITIATORS MOUNTED PERPENDICULAR TO ITS BASE PLATE, WHICH WAS SELECTED AND FIRED BY AN ASTRONAUT. THE THUMPER WAS CABLE-CONNECTED TO THE CENTRAL STATION AND WAS FIRED AT INTERVALS OF 5 M. THUMPER FIRINGS PRODUCED APPROXIMATELY 40 M PRODUCED WEAK SIGNALS. ONE D-WAVE VELOCITY OF 114 M/SEC WAS MEASURED. THE GROPHONES WERE ELECTROMAGNETIC LISTENING DEVICES THAT WERE CABLE-CONNECTED TO THE CENTRAL STATION, WHERE THEY WERE AMPLIFIED, DIGITIZED, AND TRANSMITTED TO EARTH. THEY WERE PLACED AT DISTANCES OF 3, 43, AND 93 M FROM THE CENTRAL STATION. THE MORTAR BOX GRENADES WERE ROCKET-LAUNCHED BY EARTH COMMAND. THEY IMPACTED AT RANGES OF APPROXIMATELY 150, 300, AND 900 M FROM THE DEPLOYED MORTAR BOX ASSEMBLY. THE DECISION NOT TO LAUNCH GRENADE NO. 1 (1500 M) WAS MADE BECAUSE THE LAUNCH ASSEMBLY PITCH-ANGLE SENSOR WENT OFF-SCALE HIGH, MAKING THE PITCH POSITION OF THE ASSEMBLY UNCERTAIN.

***** APOLLO 16 LM/ALSEP, LATHAM *****

EXPERIMENT NAME- PASSIVE SEISMIC

NSSDC ID- 72-031C-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/21/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.V. LATHAMU OF TEXAS, GALVESTON
GALVESTON, TX
OI - F. PRESSMASS INST OF TECH
CAMBRIDGE, MA
OI - G. SUTTONU OF HAWAII
HONOLULU, HI

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE PASSIVE SEISMIC EXPERIMENT (PSE) (S-031), WHICH WAS PART OF THE ALSEP, WAS TO MEASURE SEISMIC SIGNALS FROM ALL EXTERNAL AND INTERNAL SOURCES OF SEISMIC ENERGY ON THE MOON. THE DATA FROM THIS EXPERIMENT WILL BE USED TO DETERMINE THE INTERNAL LUNAR STRUCTURE, RATE OF ENERGY RELEASE, AND NUMBERS AND MASSES OF IMPACTING METEORS. THIS EXPERIMENT USED THE DATA FROM EXPERIMENTS ON THE IMPACTS OF THE S-IV B AND LM ASCENT STAGES AS EXTERNAL CALIBRATION SOURCES. THE INSTRUMENT PACKAGE REPRESENTED THE FOURTH ACTIVE INSTRUMENT AVAILABLE IN THE LUNAR SEISMIC NETWORK AND WILL ENABLE SCIENTISTS TO LOCATE REGIONS OF SEISMIC ACTIVITY MORE PRECISELY. THE INSTRUMENT PACKAGE WAS COMPOSED OF TWO ASSEMBLIES -- (1) A LONG-PERIOD, TRIAXIAL, ORTHOGONAL SEISMOMETER WITH A SEISMIC FREQUENCY RESPONSE FROM 0.004 TO 3 HZ (NO DB) DYNAMICAL RANGE AND (2) A SHORT-PERIOD, UNIAXIAL, VERTICAL MOTION SEISMOMETER WITH A SEISMIC FREQUENCY RESPONSE FROM 0.05 TO 20 HZ (NO-DB) DYNAMICAL RANGE AND THE MINIMUM DETECTABLE SIGNALS OF 0.3 MICRON AT A FREQUENCY OF 1 HZ. THE INSTRUMENT PACKAGE WAS CABLE-CONNECTED TO THE CENTRAL ALSEP POWER STATION WHICH WAS DEPLOYED BY THE ASTRONAUTS.

***** APOLLO 17 LM/ALSEP *****

SPACECRAFT COMMON NAME- APOLLO 17 LM/ALSEP
ALTERNATE NAMES- APOLLO 17C, 06307
LEM 17, ROVER 17
ALSEP 17

NSSDC ID- 72-090C

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/11/72.

LAUNCH DATE- 12/07/72 SPACECRAFT WEIGHT- 5050. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- SATURN 5

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DMSF
UNITED STATES NASA-DSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - W.F. EICHELMANNASA-JSC
HOUSTON, TX

SPACECRAFT BRIEF DESCRIPTION

THE APOLLO 17 LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) WAS DEPLOYED BY THE ASTRONAUTS IN THE NORTHEASTERN PORTION OF THE MOON (LATITUDE 20 DEG 10 MIN N, LONGITUDE 30 DEG 48 MIN E) ON THE SOUTHEASTERN RIM OF MARE SERENITATIS IN A DARK DEPOSIT BETWEEN MASSIVE UNITS OF THE SOUTHWESTERN TAURUS MOUNTAINS SOUTH OF LITTON CRATER. THE ALSEP EXPERIMENTS WERE POWERED BY A NUCLEAR POWER SOURCE AND INCLUDED STUDY OF THE ATMOSPHERIC AND IONIC ENVIRONMENT OF THE MOON, HEAT LOSS FROM THE LUNAR INTERIOR, LUNAR EJECTA AND METEORITES, LUNAR SEISMIC PROFILING, AND LUNAR SURFACE GRAVIMETER.

----- APOLLO 17 LM/ALSEP, BERG -----
 EXPERIMENT NAME- LUNAR EJECTA AND METEORITES
 NSSDC ID- 72-096C-05

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
 AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 12/17/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - D.E. BERGNASA-GSFC
 GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
 THE APOLLO 17 LUNAR EJECTA AND METEORITE EXPERIMENT MEASURED THE FREQUENCY WITH WHICH THE MOON IS IMPACTED BY PRIMARY COSMIC DUST PARTICLES AND THE EFFECT OF THE LUNAR EJECTA EMANATING FROM THE SITES OF METEORITE IMPACTS ON THE LUNAR SURFACE. THE EXPERIMENT HAD THE FOLLOWING SPECIFIC OBJECTIVES: (1) TO DETERMINE THE BACKGROUND AND LONG-TERM VARIATIONS OF COSMIC DUST INFLUX RATES IN CISELUNAR SPACE, (2) TO DETERMINE THE EXTENT AND NATURE OF LUNAR EJECTA PRODUCED BY METEORITE IMPACTS ON THE LUNAR SURFACE, (3) TO DETERMINE THE RELATIVE CONTRIBUTION OF COMETS AND ASTEROIDS TO THE EARTH'S METEOROID ENSEMBLE, (4) TO STUDY POSSIBLE CORRELATIONS BETWEEN THE ASSOCIATED EJECTA EVENTS AND THE TIMES OF THE EARTH'S CROSSING OF COMETARY ORBITAL PLANES AND METEOR STREAMS, (5) TO DETERMINE THE EXTENT OF THE CONTRIBUTION OF INTERSTELLAR PARTICLES TOWARD THE MAINTENANCE OF THE ZODIACAL CLOUD AS THE SOLAR SYSTEM PASSES THROUGH GALACTIC SPACE, AND (6) TO INVESTIGATE THE EXISTENCE OF AN EFFECT CALLED "EARTH FOCUSING OF DUST PARTICLES." THE EQUIPMENT FOR THIS EXPERIMENT, WHICH WAS PART OF THE APOLLO 17 ALSEP, INCLUDED ONE DEPLOYABLE UNIT WITH DETECTOR PLATES, ALSEP CENTRAL STATION ELECTRONICS, AND THE CABLE AND ASTROMAT CONNECTED FOR MATING THE EXTERNAL UNIT WITH THE CENTRAL STATION. THE EXTERNAL UNIT COMPONENTS OR SENSORS CONSISTED OF SUPPRESSOR AND COLLECTOR PLATES, IMPACT PLATES, FILM FRAMES, AN MICROPHONES. THE SENSOR HAD A FIELD OF VIEW OF PLUS OR MINUS 60 DEG AND AN ANGULAR RESOLUTION OF PLUS OR MINUS 26 DEG. IT MEASURED PARTICLE IMPACTS IN AN ENERGY RANGE OF 1 TO 1000 ERGS WITH A PRIMARY FREQUENCY OF MEASUREMENT OF 10-4 IMPACTS/SEC. THE EXTERNAL UNIT WAS ERRECTED AND DEPLOYED ON THE LUNAR SURFACE ABOUT 8 M SOUTH OF THE ALSEP CENTRAL STATION. THE UNIT WAS ALIGNED TO PLUS OR MINUS 5 DEG OF THE SCAN-SHADOW LINE AND LEVELLED TO PLUS OR MINUS 5 DEG. A COVER PROVIDED TO SHIELD THE DETECTOR PLATES FROM DIRT PARTICLES PRODUCED DURING LUNAR MOBILE ASCENT. LIFTOFF WAS JETTISONED BY EARTH COMMAND AT A SUITABLE TIME AFTER LIFTOFF.

----- APOLLO 17 LM/ALSEP, KOVACH -----

EXPERIMENT NAME- LUNAR SEISMIC PROFILING EXPERIMENT
 NSSDC ID- 72-096C-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
 AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 12/20/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - R.L. KOVACHSTANFORD U
 STANFORD, CA
 DI - J.S. WATKINSU OF TEXAS, GALVESTON
 GALVESTON, TX

EXPERIMENT BRIEF DESCRIPTION
 THE PURPOSE OF THE LUNAR SEISMIC PROFILING EXPERIMENT (IS-203) WAS TO ACQUIRE DATA ON THE PHYSICAL PROPERTIES OF THE LUNAR NEAR-SURFACE MATERIALS. SPECIFIC OBJECTIVES INCLUDED MEASURING THE LUNAR SEISMIC SIGNALS PRODUCED BY DETONATION OF EXPLOSIVE CHARGES ON THE SURFACE, MONITORING NATURAL SEISMIC ACTIVITY RESULTING FROM EARTHQUAKES OR METEORITE IMPACTS, RECORDING THE SEISMIC SIGNALS RESULTING FROM THE ASCENT OF THE LM, AND RECORDING THE SEISMIC SIGNALS RESULTING FROM THE IMPACT OF THE SPENT LM ASCENT STAGE. THIS EXPERIMENT YIELDED DETAILED INFORMATION ON LUNAR GEOLOGIC CHARACTERISTICS TO DEPTHS OF 3 KM. THE EQUIPMENT CONSISTED OF FOUR GEOPHONES, MARKER FLAGS, A GEOPHONE MODULE WITH A MARKER FLAG, AN ELECTRONICS PACKAGE IN THE ALSEP CENTRAL STATION, A TRANSMITTER, AN ANTENNA, AND EIGHT EXPLOSIVE PACKAGES. THE EXPLOSIVE PACKAGE MAJOR COMPONENTS WERE A RECEIVING ANTENNA, A RECEIVER, AN EXPLOSIVE TRAIN, A SIGNAL PROCESSOR, AND A FIRING PULSE GENERATOR. THE CREW DEPLOYED THE GEOPHONES AND THE GEOPHONE MODULE MARKED WITH FLAGS AND THEN PHOTOGRAPHED THEM DURING EVA 1. THE ANTENNAS AND ELECTRONICS PACKAGE WERE ALSO DEPLOYED AND CONNECTED TO THE ALSEP CENTRAL STATION. THE EXPLOSIVE PACKAGES WERE DEPLOYED AT DESIGNATED SITES DURING THE LUNAR TRAVERSES.

----- APOLLO 17 LM/ALSEP, LANGFETH -----

EXPERIMENT NAME- HEAT FLOW

NSSDC ID- 72-096C-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
 AT THE STANDARD DATA ACQUISITION RATE SINCE 12/11/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - N.G. LANGFETHLAMONT-DOHERTY GEO OBS
 PALISADES, NY
 DI - S.P. CLARK, JR.YALE U
 NEW HAVEN, CT

01 - J.L. CHUTE, JR.LEHMAN COLLEGE
 NEW YORK, NY

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE HEAT FLOW EXPERIMENT (S-037) WAS TO DETERMINE THE RATE OF HEAT LOSS FROM THE LUNAR INTERIOR. SPECIFIC OBJECTIVES WERE (1) MEASUREMENT OF THE SUBSURFACE VERTICAL TEMPERATURE GRADIENTS IN THE LUNAR SURFACE LAYER AS A FUNCTION OF TIME, (2) MEASUREMENT OF THE ABSOLUTE TEMPERATURE OF THE LUNAR SUBSURFACE AS A FUNCTION OF TIME, (3) DETERMINATION OF THE THERMAL CONDUCTIVITY OF THE LUNAR SUBSURFACE MATERIAL, AND (4) MEASUREMENT OF THE BRIGHTNESS TEMPERATURE OF THE LOCAL LUNAR SURFACE. MEASUREMENTS TAKEN OF THE HEAT FLUX THROUGH THE UPPER 2.4 M OF THE SURFACE PROVIDED DATA ON THE LUNAR SOIL THERMAL CONDUCTIVITY, CONTRIBUTED TO THE RESOLUTION OF ISSUES CONCERNING LUNAR INTERNAL HEATING PROCESSES, AND ESTABLISHED LIMITS OF CONSTRAINT ON THE INTERIOR TEMPERATURE AND COMPOSITION OF THE MOON. THE EXPERIMENT CONSISTED OF TWO PROBES, EACH ABOUT 1.2 M IN LENGTH, A SPECIAL TOOL FOR PROBE INSERTION, RADIATION SHIELDS FOR EACH PROBE, AND AN ELECTRONICS PACKAGE THAT WAS CABLE-CONNECTED TO THE PROBES AND THE ALSEP CONTROL STATION. TWO HOLES WERE DRILLED IN THE LUNAR SURFACE ABOUT 10 M APART. THE CORE SYSTEMS REMAINED IN THE HOLES TO PROVIDE A CASING TO PREVENT WALL COLLAPSE. ONE PROBE WAS INSERTED INTO EACH HOLE, AND THE DEPTH OF THE PROBE WAS RECORDED.

----- APOLLO 17 LM/ALSEP, WEBER -----

EXPERIMENT NAME- LUNAR SURFACE GRAVIMETER

NSSDC ID- 72-096C-09

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
 AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 12/12/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - J. WEBERU OF MARYLAND
 COLLEGE PARK, MD
 DI - J.V. LARSONU OF MARYLAND
 COLLEGE PARK, MD

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE LUNAR SURFACE GRAVIMETER EXPERIMENT (S-207) WAS TO OBTAIN HIGHLY ACCURATE MEASUREMENTS OF THE LUNAR SURFACE GRAVITATIONAL ACCELERATION AND ITS TEMPORAL VARIATIONS AT A SELECTED POINT ON THE SURFACE. SPECIFIC OBJECTIVES WERE DETERMINATION OF THE VALUE OF LUNAR GRAVITY RELATIVE TO EARTH GRAVITY (WITH AN ACCURACY OF ABOUT 1 PART IN 10 TO THE FIFTH POWER), DETERMINATION OF THE MAGNITUDE OF LUNAR SURFACE DEFORMATION DUE TO TIDAL FORCES, MEASUREMENT OF VERTICAL COMPONENTS OF LUNAR NATURAL SEISMICITY, AND MONITORING OF FREE OSCILLATIONS OF THE MOON THAT MAY BE INDUCED BY GRAVITATIONAL RADIATION FROM COSMIC SOURCES. PRECISE MEASURES OF ACCELERATION DUE TO GRAVITY OVER A PERIOD OF SEVERAL MONTHS ESTABLISHED THE DEFORMATION DUE TO TIDAL FORCES AND CONTRIBUTED TO CONCLUSIONS ABOUT THE INTERNAL CONSTITUTION OF THE MOON. THE EQUIPMENT CONSISTED OF ELECTRONICS, SENSORS (SPRING MASS SUSPENSION CAPACITOR PLATES), A SUNSHIELD, AND A RIBBON CABLE TO THE CENTRAL STATION. THE CREW DEPLOYED THIS EXPERIMENT ABOUT 8 M OF THE ALSEP CENTRAL STATION. THIS PROCEDURE CONSISTED OF LEVELING WITHIN PLUS OR MINUS 3 DEG, ALIGNMENT WITHIN PLUS OR MINUS 3 DEG USING THE SUNSHIELD SHADOW, AND MATING THE CABLE TO THE CENTRAL STATION.

***** ASTP *****

SPACECRAFT COMMON NAME- ASTP
 ALTERNATE NAMES- APOLLO-SOYUZ TEST PROJ
 NSSDC ID- ASTP

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 07/15/75 SPACECRAFT WEIGHT- KG
 LAUNCH SITE-
 LAUNCH VEHICLE-

SPONSORING COUNTRY/AGENCY
 UNITED STATES NASA-OMSF
 U.S.S.R. SAS

PLANNED ORBIT PARAMETERS
 ORBIT TYPE- GEOCENTRIC
 ORBIT PERIOD- 93. MIN INCLINATION- 61.0 DEG
 PERIAPSIS- 225. KM ALT APOAPSIS- 225. KM ALT

SPACECRAFT PERSONNEL (PH=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PH - L. CASEYNASA HEADQUARTERS
 WASHINGTON, DC
 PS - BUSHEVUNKNOWN
 USSR

SPACECRAFT BRIEF DESCRIPTION

THE APOLLO-SOYUZ TEST PROJECT (ASTP) WILL BE THE FIRST INTERNATIONAL MANNED SPACE FLIGHT. IT WILL TEST A DOCKING AND RENDEZVOUS SYSTEM CONTRIBUTING TO DEVELOPMENT OF INTERNATIONAL SPACE RESCUE CAPABILITY AND FUTURE COOPERATION IN MANNED SPACE MISSIONS. THE SPACECRAFT WILL CARRY FOUR ASTRONAUTY AND SPACE PHYSICS EXPERIMENTS, FIVE LIFE SCIENCES EXPERIMENTS, AND EIGHT SPACE APPLICATIONS EXPERIMENTS.

REPRODUCIBILITY OF THE
 ORIGINAL PAGE IS POOR

----- ASTP, ANG -----

EXPERIMENT NAME- INFLUENCE OF WEIGHTLESSNESS ON THE
IMMISCIBILITY OF MONOTECTIC ALLOY SYSTEMS

NSSDC ID- ASTP -06

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.Y. ANGNORTHROP CORP LAB
HAWTHORNE, CA

EXPERIMENT BRIEF DESCRIPTION

SPECIMENS OF TWO DIFFERENT ALLOYS WILL BE MELTED AND
SAMPLES WITHDRAWN AFTER VARYING PERIODS TO ASSESS HOW THE LACK
OF STRATIFICATION IN WEIGHTLESS MIXTURES OF LIQUIDS OF
DIFFERING DENSITIES MAY INFLUENCE THE APPROACH TO EQUILIBRIUM
IN THE FORMATION OF INTERMETALLIC COMPOUNDS.

----- ASTP, DOWYER -----

EXPERIMENT NAME- EXTREME ULTRAVIOLET ASTRONOMY

NSSDC ID- ASTP -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.S. DOWYERU OF CALIF, BERKELEY
BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THIS ASTP EXPERIMENT WILL BE PERFORMED TO SEARCH FOR
SOURCES OF EXTREME ULTRAVIOLET RADIATION (EUV) IN THE NIGHT
SKY. THE PRINCIPAL INSTRUMENT WILL BE A FLUX-COLLECTING
GRAZING-INCIDENCE TELESCOPE WITH AN EUV DETECTOR AT ITS FOCAL
POINT, MOUNTED OUTSIDE THE SPACECRAFT.

----- ASTP, DOWYER -----

EXPERIMENT NAME- HELIUM GLOW

NSSDC ID- ASTP -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.S. DOWYERU OF CALIF, BERKELEY
BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THIS ASTP EXPERIMENT WILL BE PERFORMED TO MEASURE THE
INTENSITY AND SPATIAL DISTRIBUTION OF HELIUM-FLUORESCENT
RADIATION IN SELECTED REGIONS OF THE NIGHT SKY. THE
MEASUREMENTS COULD GIVE THE DISTRIBUTION OF HELIUM IN
INTERPLANETARY SPACE, AND INDICATE THE PENETRATION OF
INTERSTELLAR HELIUM INTO THE SOLAR SYSTEM. MEASUREMENTS WILL
BE MADE WITH A NARROW-PASSBAND PHOTOMETER, SENSITIVE TO HELIUM
RADIATION AND POINTED TO AN ACCURACY OF 4 DEG.

----- ASTP, DUCKER -----

EXPERIMENT NAME- BIOSTACK

NSSDC ID- ASTP -16

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H. DUCKERU OF FRANKFURT
FRANKFURT, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL PROVIDE DATA ON THE EFFECTS COSMIC
RAYS AND OTHER SPACE FLIGHT RADIATION MAY HAVE ON DEVELOPMENT
OF SELECTED BIOLOGICAL MATERIALS. SIMILAR EXPERIMENTS WERE
FLOWN ABOARD THE APOLLO 16 AND 17 SPACECRAFT. LAYERS OF
DACILLUS SURTILIS SPORES (BACTERIA SPORES), COLPODA CUCULLUS
CYSTS (PROTOZOA CYSTS), ARABIDOPSIS THALIANA SEEDS (WATERCRESS
SEED), VICIA FABA RADICULA (BEAN ROOTS), ARTEMIA SALINA EGGS
(BRINE SHRIMP), AND THIOGLUM CASTANEUM EGGS (BEETLE EGGS)
WILL BE STACKED ALTERNATELY WITH LAYERS OF DIFFERENT TRACK
DETECTORS (NUCLEAR EMULSIONS, PLASTICS, AND SILVER CHLORIDE
CRYSTALS). THE STACK WILL BE SEALED IN A SMALL CONTAINER AND
PLACED ABOARD THE APOLLO SPACECRAFT. AFTER RECOVERY, A
COMPARISON WILL BE MADE OF THE DEVELOPMENT OF THE BIOLOGICAL
SAMPLES WITH BALLOON AND GROUND-BASED IRRADIATION EXPERIMENTS.
ANY MUTATION OR OTHER DEVELOPMENT ANOMALIES WILL BE OF
PARTICULAR INTEREST. DATA WILL CONTRIBUTE TOWARD ESTIMATING
RADIATION HAZARDS DURING SPACE FLIGHT.

----- ASTP, CRISWELL -----

EXPERIMENT NAME- EFFECTS OF SPACE FLIGHT ON THE CELLULAR
RESPONSE OF MAN

NSSDC ID- ASTP -14

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - B.S. CRISWELLNAVY U
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO STUDY THE
EFFECTS OF SPACE FLIGHT ON THE RESPONSE OF LYMPHOCYTE CELLS TO
INFECTIOUS AGENTS. STUDIES WILL BE MADE OF LYMPHOCYTES IN
BLOOD SAMPLES TAKEN FROM THE ASTRONAUTS BEFORE AND AFTER THE
MISSION. THE DATA CAN BE COORDINATED WITH THAT OBTAINED ON THE
POLYMOYPHONUCLEAR LEUKOCYTE CELL EXPERIMENT.

----- ASTP, DONAHUE -----

EXPERIMENT NAME- ULTRAVIOLET ATMOSPHERIC ABSORPTION

NSSDC ID- ASTP -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.M. DONAHUEU OF MICHIGAN
ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THIS ASTP EXPERIMENT WILL BE PERFORMED TO MEASURE THE
CONCENTRATION OF ATMOSPHERIC CONSTITUENTS, ESPECIALLY ATOMIC
OXYGEN AND NITROGEN, IN THE ATMOSPHERE BY ULTRAVIOLET
ABSORPTION AND RESONANCE-SCATTERING SPECTROSCOPY. UTILIZING
THE SPACE BETWEEN THE TWO SPACECRAFT, ULTRAVIOLET LIGHT FROM
RESONANCE LINES SOURCES WILL BE SENT BY A TELESCOPE MOUNTED ON
THE APOLLO TO AN ARRAY OF CORNER CUBES ON THE SOYUZ AND
RETURNED TO A SCANNING SPECTROMETER/DETECTOR ON THE APOLLO.
THE EXPERIMENT WILL INTRODUCE A NEW TECHNIQUE FOR MEASURING
ATMOSPHERIC CONSTITUENTS. THE DISTANCE BETWEEN THE TWO
SPACECRAFT WILL BE VARIED TO ELIMINATE ABSORPTION EFFECTS OF
CONTAMINANTS AROUND EITHER SPACECRAFT.

----- ASTP, FRIEDMAN -----

EXPERIMENT NAME- SKY-EARTH X-RAY OBSERVATIONS

NSSDC ID- ASTP -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.D. FRIEDMANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS ASTP EXPERIMENT WILL BE PERFORMED TO PRODUCE A
DETAILED MAP OF CELESTIAL SOFT X-RAY EMISSIONS IN THE 0.1- TO
1.0-KEV RANGE. ROCKET OBSERVATIONS HAVE DETECTED A DIFFUSE
BACKGROUND OF SOFT X-RAY RADIATION, BUT A SYSTEMATIC SKY
SURVEY HAS NEVER BEEN MADE IN THE 0.1- TO 1.0-KEV ENERGY
RANGE. SATELLITE OBSERVATIONS WILL PROVIDE FINER ANGULAR
RESOLUTION AND STATISTICS NEEDED TO DETERMINE THE VARIOUS
SOURCES THAT CONTRIBUTE. THE THIN-WINDOW, SOFT X-RAY DETECTOR
WILL BE MOUNTED IN A BAY OF THE APOLLO SERVICE MODULE.

----- ASTP, GATOS -----

EXPERIMENT NAME- DETERMINATION OF ZERO-GRAVITY EFFECTS ON
ELECTRONIC MATERIALS PROCESSING

NSSDC ID- ASTP -08

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.C. GATOSMASS INST OF TECH
CAMBRIDGE, MA

OI - A.F. WITFMASS INST OF TECH
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

A CYLINDRICAL CRYSTAL OF DOPED GERMANIUM WILL BE PARTLY
MELTED AND THEN RESOLIDIFIED. DURING SOLIDIFICATION,
ARTIFICIAL GROWTH BANDS WILL BE INTRODUCED INTO THE CRYSTAL BY
ELECTRICAL PULSES AT 6-SEC INTERVALS, AND WILL PRODUCE HEATING
AT THE SOLID/LIQUID INTERFACE. THE BANDS WILL PROVIDE A TIME
REFERENCE FOR DETERMINATION OF MICROSCOPIC GROWTH RATES. THIS
INFORMATION, AND MEASUREMENTS OF THE DISTRIBUTION OF MATERIAL
WITHIN THE CRYSTAL, WILL MAKE POSSIBLE DETAILED ANALYSIS OF
THE GROWTH PROCESS.

----- ASTP, HANNING -----

EXPERIMENT NAME- ELECTROPHORESIS

NSSDC ID- ASTP -11

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - K. MANNINGHRPI
GARCHING, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO ANALYZE, PURIFY, AND ISOLATE SAMPLES FOR MEDICAL AND BIOLOGICAL RESEARCH. IT MAY CONTRIBUTE TOWARD DEVELOPMENT OF SEPARATION METHODS FOR PRODUCING VACCINES AND SERUMS IN SPACE FOR MEDICAL USE ON EARTH. HUMAN AND RABBIT BLOOD CELLS WILL BE INTRODUCED CONTINUOUSLY INTO A BUFFER FLUID WHICH WILL FLOW THROUGH AN ELECTRICAL FIELD. THE CELLS WILL BE SEPARATED INTO THEIR CONSTITUENTS AT VARIOUS ANGLES AS THEY MIGRATE THROUGH THE BUFFER FLUID. THE SEPARATED CONSTITUENTS OF THE CELLS CAN BE ANALYZED AND COLLECTED. THE ZERO-G SPACE ENVIRONMENT WILL ALLOW HIGHER FLOW RATE AND BETTER YIELD OF SEPARATION THAN CAN BE ACHIEVED IN EARTH'S GRAVITY. FACTORS LIKE HEAT CONVECTION, SEDIMENTATION, AND BUOYANCY LIMIT EFFECTIVE SEPARATION IN EARTH'S GRAVITY.

----- ASTP, LAPSON -----

EXPERIMENT NAME- POLY OF CONVECTION IN SOLIDIFICATION
PROCESS IN HIGH EXERCISE STRAIGHT MAGNET

NSSDC ID- ASTP -07

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D. LAPSONGRUMMAN AEROSPACE CORP
HUTHPAGE, NY
OI - T.Z. KATAMISU OF CONNECTICUT
STORRS, CT

EXPERIMENT BRIEF DESCRIPTION

MAGNETIC MATERIALS WILL BE MELTED AND RESOLIDIFIED AT CONTROLLED RATES TO SEE WHETHER CAST MATERIALS WITH IMPROVED PROPERTIES CAN BE MADE UNDER WEIGHTLESS CONDITIONS.

----- ASTP, MARTIN -----

EXPERIMENT NAME- POLYMORPHONUCLEAR LEUKOCYTE RESPONSE TO
INFECTION

NSSDC ID- ASTP -13

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.R. MARTINBAYLOR U
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO STUDY POSSIBLE EFFECTS OF WEIGHTLESSNESS ON THE FUNCTION OF POLYMORPHONUCLEAR LEUKOCYTES. BLOOD SAMPLES WILL BE TAKEN FROM THE ASTRONAUTS BEFORE AND AFTER THE MISSION AND COMPARATIVE STUDIES WILL BE MADE OF WHITE CELL RESPONSE TO BACTERIA. THE DATA WILL PROVIDE ADDITIONAL INFORMATION ON THE POSSIBLE EFFECTS OF A LONG-DURATION SPACE MISSION ON RESISTANCE TO BACTERIAL INFECTIONS.

----- ASTP, REED -----

EXPERIMENT NAME- SURFACE TENSION INDUCED CONVECTION IN
ENCAPSULATED LIQUID METALS IN ZERO G

NSSDC ID- ASTP -05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.E. REEDOAK RIDGE NATL LAB
OAK RIDGE, TN
OI - F.J. BRUNIOAK RIDGE NATL LAB
OAK RIDGE, TN

EXPERIMENT BRIEF DESCRIPTION

PAIRED SPECIMENS OF ALLOYS CONTAINING SMALL AMOUNTS OF GOLD WILL BE MELTED IN IRON AND GRAPHITE CAPSULES AND ALLOWED TO MIX. AFTER THE METALS HAVE SOLIDIFIED AND BEEN RETURNED TO EARTH, THEY WILL BE CUT INTO THIN SLICES AND THE SECTIONS ANALYZED FOR DISTRIBUTION OF GOLD TO DETERMINE THE PRESENCE OR ABSENCE OF CONVECTIVE EFFECTS CAUSED BY VARIATIONS IN SURFACE TENSION DURING THE HEATING.

----- ASTP, TAYLOR -----

EXPERIMENT NAME- MICROBIAL EXCHANGE TEST

NSSDC ID- ASTP -15

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G.R. TAYLORNASA-JSC
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO QUANTITATIVELY MONITOR THE MICROBIAL LOAD OF CREWMEN AND THE DEGREE OF MICROBIAL EXCHANGE BETWEEN CREWMEN. MICROBIOLOGICAL SAMPLES WILL BE COLLECTED WITH SWABS FROM THE ASTRONAUTS AND COSMONAUTS AND FROM THE INTERIOR OF THE APOLLO AND SOYUZ SPACECRAFT AT SPECIFIED TIMES BEFORE, DURING, AND AFTER THE FLIGHT. INFLIGHT SAMPLES WILL BE COLLECTED BY THE CREWMEN WHILE THE TWO SPACECRAFT ARE DOCKED. COMPARISONS BETWEEN SAMPLE PERIODS, INDIVIDUALS, AND COLLECTION SITES WILL ESTABLISH MICROBIAL EXCHANGE PATTERNS.

----- ASTP, TOBIAS -----

EXPERIMENT NAME- LIGHT FLASHES AND OTHER SENSATIONS FROM
COSMIC PARTICLES

NSSDC ID- ASTP -17

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.A. TOBIASLAWRENCE LIVERMORE LAB
LIVERMORE, CA
OI - T.F. BUDINGERU OF CALIF, BERKELEY
BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WILL BE TO ASCERTAIN THE FREQUENCIES AT WHICH COSMIC RAYS CAN BE DETECTED BY FLIGHT CREWS IN EARTH ORBIT, AND THE LATITUDES AT WHICH THE PHENOMENON OCCURS. DURING APOLLO MISSIONS, ASTRONAUTS REPORTED SEEING BRIGHT FLASHES AND STREAKS OF LIGHT DURING TOTAL DARKNESS. THE FLASHES ARE THOUGHT TO BE HEAVY PARTICLES FROM GALACTIC COSMIC RAYS INTERACTING WITH TISSUE IN OR NEAR THE RETINA OF THE EYE. HOWEVER, OBSERVATIONS BY THE APOLLO CREWS WERE NOT CONSISTENT AS TO THE FREQUENCY THE PHENOMENON OCCURRED. WHILE CARRYING OUT THE EXPERIMENT ON THE ASTP MISSION, CREWMEN WILL DON A SPECIALLY-FITTED FULL HEAD MASK WHICH WILL BE SOUNDPROOF AND LIGHTPROOF. THE MASK WILL BE WORN FOR PERIODS OF ONE TO TWO HOURS WHILE REPORTING LIGHT FLASH PHENOMENA OR SENSATIONS OF SOUND, TASTE, AND SMELL WHICH MIGHT BE CONSIDERED UNUSUAL IN CONNECTION WITH THESE LIGHT FLASHES. COSMIC PARTICLE DETECTORS, LIGHT-EMITTING DIODES, AND A SPEAKER SYSTEM FOR COMMUNICATION PURPOSES WILL BE BUILT INTO THE MASK. DATA WILL CONTRIBUTE TO LABORATORY STUDIES FOR DETECTION OF COSMIC RAYS AND ESTIMATING RADIATION HAZARDS DURING SPACE FLIGHT.

----- ASTP, WEIFFENBACH -----

EXPERIMENT NAME- SPACECRAFT-TO-SPACECRAFT DOPPLER
TRACKING

NSSDC ID- ASTP -12

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G.C. WEIFFENBACHSAD
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE APOLLO-SOYUZ VHF RANGING SYSTEM WILL BE USED TO MEASURE CHANGES IN THE DISTANCE BETWEEN THE TWO SPACECRAFT AS INDICATIONS OF LOCAL ANOMALIES OF EARTH'S GRAVITY FIELD. THE STRUCTURE OF THE EARTH'S GRAVITY FIELD IS OF SCIENTIFIC INTEREST BECAUSE IT IS ONE OF THE CLUES TO INTERNAL DISTRIBUTION OF THE EARTH'S MASS. DATA ON GRAVITY ANOMALIES WILL CONTRIBUTE TO GEOLOGICAL AND GEOPHYSICAL STUDIES OF CONTINENTAL DRIFT, EARTHQUAKES, VOLCANIC ACTIVITY, AND MINERAL RESOURCES.

----- ASTP, WIEDEMAYER -----

EXPERIMENT NAME- CRYSTAL GROWTH FROM THE VAPOR PHASE IN
ZERO-GRAVITY ENVIRONMENT

NSSDC ID- ASTP -09

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - H. WIEDEMAYERRENSSELAER POLYTECHNIC
ROCHESTER, NY

EXPERIMENT BRIEF DESCRIPTION

THREE EXPERIMENTS WILL BE PERFORMED ON THE GROWTH OF SEMICONDUCTOR CRYSTALS IN THE FURNACE, USING DIFFERENT MATERIALS, TO SEE HOW THE GROWTH PROCESS IN WEIGHTLESSNESS DIFFERS FROM CRYSTAL GROWTH ON EARTH.

----- ASTP, YUE -----

EXPERIMENT NAME- ZERO-GRAVITY SOLIDIFICATION OF NaCl-LiF
EUTECTIC

NSSDC ID- ASTP -10

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - A.S. YUEU OF CALIF, LA
LOS ANGELES, CA
OI - C.W. YEHU OF CALIF, LA
LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
SAMPLES OF A SODIUM-CHLORIDE AND LITHIUM-FLUORIDE
COMPOSITION WITH A LOW MELTING POINT WILL BE MELTED IN THE
FURNACE AND THEN SOLIDIFIED. THIS MATERIAL SOLIDIFIES IN THE
FORM OF FIBERS OF LITHIUM-FLUORIDE EMBEDDED IN SODIUM-CHLORIDE
THAT CAN ACT AS AN IMAGE-TRANSMITTING MEDIUM FOR INFRARED
LIGHT. THE EXPERIMENT WILL ATTEMPT TO PRODUCE SAMPLES WITH A
FIBER DISTRIBUTION SHOWING A HIGH DEGREE OF ORIENTATION,
REGULARITY, AND FIBER CONTINUITY.

*****ASTP-APOLLO*****

SPACECRAFT COMMON NAME- ASTP-APOLLO
ALTERNATE NAMES-
NSSDC ID- ASTP-A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 07/15/75 SPACECRAFT WEIGHT- KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- SATURN 1B

SPONSORING COUNTRY/AGENCY NASA-DMSF
UNITED STATES

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC INCLINATION- 51.8 DEG
ORBIT PERIOD- 93. MIN APDAPSIS- 225. KM ALT
PERIAPSIS- 225. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.W. LEENASA HEADQUARTERS
WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
THE UNITED STATES AND THE U.S.S.R. WILL LAUNCH AN APOLLO
SPACECRAFT (ASTP-A) AND A SOYUZ SPACECRAFT (ASTP-S),
RESPECTIVELY, AS A JOINT EFFORT CALLED THE APOLLO-SOYUZ TEST
PROJECT (ASTP). THE SOYUZ SPACECRAFT WILL BE LAUNCHED FIRST,
WITH A TWO-MAN CREW WHO WILL MANEUVER THEIR SPACECRAFT INTO A
DOCKING ORBIT. THE APOLLO SPACECRAFT WILL BE LAUNCHED 7 1/2 HR
LATER, WITH A THREE-MAN CREW WHO WILL PLACE THEIR SPACECRAFT
INTO A PROPER CONFIGURATION FOR DOCKING WITH THE SOYUZ
SPACECRAFT. THE DOCKING OF THE TWO SPACECRAFT IS TO OCCUR
ABOUT TWO DAYS INTO THE MISSION. AFTER DOCKING, CREW TRANSFERS
WILL TAKE PLACE, WITH THE APOLLO CREW FIRST VISITING THE
SOYUZ. THE COMBINED APOLLO-SOYUZ CREWS WILL PERFORM JOINT
EXPERIMENTS AND PRESENT RADIO AND TV REPORTS. AFTER THE JOINT
EXPERIMENTS HAVE BEEN COMPLETED, THE SPACECRAFT WILL DISENGAGE
AND EACH WILL CONTINUE ITS SEPARATE MISSION.

*****ASTP-SOYUZ*****

SPACECRAFT COMMON NAME- ASTP-SOYUZ
ALTERNATE NAMES-
NSSDC ID- ASTP-S

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 07/15/75 SPACECRAFT WEIGHT- KG
LAUNCH SITE- TYURATAM-DAIKONUR, U.S.S.R.
LAUNCH VEHICLE-

SPONSORING COUNTRY/AGENCY SAS
U.S.S.R.

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC INCLINATION- 51.8 DEG
ORBIT PERIOD- 93. MIN APDAPSIS- 225. KM ALT
PERIAPSIS- 225. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN
PS - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION
THE UNITED STATES AND THE U.S.S.R. WILL LAUNCH AN APOLLO
SPACECRAFT (ASTP-A) AND A SOYUZ SPACECRAFT (ASTP-S),
RESPECTIVELY, AS A JOINT EFFORT CALLED THE APOLLO-SOYUZ TEST
PROJECT (ASTP). THE SOYUZ SPACECRAFT WILL BE LAUNCHED FIRST,
WITH A TWO-MAN CREW WHO WILL MANEUVER THEIR SPACECRAFT INTO A
DOCKING ORBIT. THE APOLLO SPACECRAFT WILL BE LAUNCHED 7 1/2 HR
LATER, WITH A THREE-MAN CREW WHO WILL PLACE THEIR SPACECRAFT
INTO A PROPER CONFIGURATION FOR DOCKING WITH THE SOYUZ
SPACECRAFT. THE DOCKING OF THE TWO SPACECRAFT IS TO OCCUR
ABOUT TWO DAYS INTO THE MISSION. AFTER DOCKING, CREW TRANSFERS
WILL TAKE PLACE, WITH THE APOLLO CREW FIRST VISITING THE
SOYUZ. THE COMBINED APOLLO-SOYUZ CREWS WILL PERFORM JOINT
EXPERIMENTS AND PRESENT RADIO AND TV REPORTS. AFTER THE JOINT
EXPERIMENTS HAVE BEEN COMPLETED, THE SPACECRAFT WILL DISENGAGE
AND EACH WILL CONTINUE ITS SEPARATE MISSION.

*****ATS 5*****

SPACECRAFT COMMON NAME- ATS 5
ALTERNATE NAMES- PL-6920, ATS-E
04060
NSSDC ID- 69-069A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 06/01/73.

LAUNCH DATE- 06/12/69 SPACECRAFT WEIGHT- 821. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- ATLAS-AGEN

SPONSORING COUNTRY/AGENCY NASA-DA
UNITED STATES

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 08/23/69
ORBIT PERIOD- 1463. MIN INCLINATION- 2.6 DEG
PERIAPSIS- 35760.0 KM ALT APDAPSIS- 36094.0 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 08/23/69
ORBIT PERIOD- 1463. MIN INCLINATION- 2.6 DEG
PERIAPSIS- 35760.0 KM ALT APDAPSIS- 36094.0 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.V. FORDYCENASA-GSFC
GREENBELT, MD
PS - T.L. AGGSONNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ATS 5 WAS AN EQUATORIAL-ORBITING, SYNCHRONOUS-ALTITUDE
TECHNOLOGY SATELLITE INTENDED TO TEST VARIOUS COMMUNICATIONS
AND EARTH OBSERVATIONAL SYSTEMS. ALSO INCLUDED ON BOARD WERE
PARTICLE, ELECTRIC FIELD, AND MAGNETIC FIELD EXPERIMENTS.
BECAUSE OF A MALFUNCTION, THE INTENDED GRAVITY GRADIENT
STABILIZATION MECHANISM COULD NOT BE DEPLOYED, AND ATS 5 WAS
STABILIZED IN A SPINNING MODE ABOUT SPACECRAFT Z AXIS AT
APPROXIMATELY 71 RPM. ALL EXPERIMENTS WHICH DEPENDED ON THE
PLANNED GRAVITY GRADIENT STABILIZATION WERE ADVERSELY AFFECTED
TO VARYING DEGREES. AND THE MISSION WAS DECLARED A FAILURE.
HOWEVER, SOME OF THE SCIENCE EXPERIMENTS, INCLUDING THE
MAGNETIC FIELD MONITOR AND THE PARTICLE EXPERIMENTS, RETURNED
USABLE DATA DURING THE OPERATIONAL LIFETIME OF THE MISSION.
ATS 5 WAS POSITIONED AT ABOUT 105 DEG W LONGITUDE OVER THE
PACIFIC OCEAN. DATA WERE RECORDED ABOUT 60 PERCENT OF THE TIME
THROUGH MOST OF THE SPACECRAFT'S OPERATIONAL LIFETIME, WHICH
EXTENDED TO JUNE 1, 1973, AFTER WHICH THE ACQUISITION RATE
DECREASED FURTHER.

-----ATS 5, MCILWAIN-----

EXPERIMENT NAME- OMNIDIRECTIONAL HIGH-ENERGY PARTICLE
DETECTOR

NSSDC ID- 69-069A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 06/00/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.E. MCILWAINU OF CALIF, SAN DIEGO
SAN DIEGO, CA

EXPERIMENT BRIEF DESCRIPTION
THREE PLASTIC SCINTILLATOR DETECTORS, EACH WITH A 2-PI
SOLID ANGLE FIELD OF VIEW, MEASURED ELECTRONS IN 12 INTERVALS
IN THE ENERGY RANGE 0.5 TO 5 MEV. SOLAR COSMIC RAYS WITH
ENERGIES GREATER THAN 12, 16, AND 24 MEV WERE ALSO MEASURED.
THE DETECTORS HAVE FUNCTIONED NORMALLY FROM LAUNCH TO AUGUST
1972 AFTER WHICH TIME THE DATA ACQUISITION WAS LIMITED TO
SELECTED TIMES. THE SPACECRAFT SPIN DID NOT DEGRADE THE
EXPERIMENT DATA.

-----ATS 5, MCILWAIN-----

EXPERIMENT NAME- BIDIRECTIONAL LOW-ENERGY PARTICLE
DETECTOR

NSSDC ID- 69-069A-11

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 06/00/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.E. MCILWAINU OF CALIF, SAN DIEGO
SAN DIEGO, CA
OI - R.W. FILLIUSU OF CALIF, SAN DIEGO
SAN DIEGO, CA
OI - J. DEFORESTU OF CALIF, SAN DIEGO
SAN DIEGO, CA

EXPERIMENT BRIEF DESCRIPTION
THIS DETECTOR MEASURED ELECTRONS AND PROTONS IN 62
LOGARITHMICALLY EQUISPACED INTERVALS IN THE ENERGY RANGE 50 EV
TO 50 KEV. FOUR CURVED-PLATE ELECTROSTATIC ANALYZERS AND
CHANNELTRON MULTIPLIERS WERE USED. TWO APERTURES WITH 5 X 5
DEG VIEW ANGLES LOOKED PARALLEL TO, AND PERPENDICULAR TO THE
SPACECRAFT SPIN AXIS, RESPECTIVELY. THE DEFLECTION VOLTAGE WAS
PROGRAMMED FOR EITHER A SCAN MODE (ONE STEP PER FRAME) OR A
PEAK TRACKING MODE. IN THE SCAN MODE, A COMPLETE SEQUENCE (62
STEPS) WAS OBTAINED IN 20.5 SEC.

----- ATS 5. SUGIURA -----

EXPERIMENT NAME- MAGNETIC FIELD MONITOR

NSSDC ID- 69-064A-13

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 06/10/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - M. SUGIURANASA-GSFC
GREENBELT, MD
OI - R.A. LANGENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO STUDY THE PROCESSES
TAKING PLACE ON THE AERIAL MAGNETIC SHELLS. IT WAS ALSO
INTENDED TO PROVIDE CORRELATIVE DATA FOR THE OTHER EXPERIMENTS
ON THE SATELLITE. THE EXPERIMENT WAS PART OF THE MAGNETIC
STABILIZATION SYSTEM THAT WAS THE BACKUP FOR THE
GRAVITY-GRADIENT STABILIZATION SYSTEM. THE SENSOR SYSTEM
CONSISTED OF A TRIAXIAL FLUXGATE MAGNETOMETER. THE SYSTEM
MEASURED THE MAGNETIC FIELD ALONG THREE AXES BY COMBINING A
FINE RANGE (PLUS AND MINUS 25 GAMMAS) AND A COARSE RANGE OF 32
INCREMENTS (32.0 GAMMAS EACH) TO GIVE THE TOTAL RANGE OF PLUS
AND MINUS 500 GAMMAS. THE FINE AND COARSE READINGS WERE
SAMPLED ON THE PCM TELEMETRY AT 5.12-SEC INTERVALS. THE FINE
READINGS ONLY WERE RECORDED ON THE PCM TELEMETRY AT 2.97-SEC
INTERVALS. THE PCM COARSE READINGS WERE SUBCOMMUTATED AT
95-SEC INTERVALS. A 10-GAMMA CALIBRATION PULSIF WAS INITIATED
TWICE A DAY FOR 5.6 MIN. THE FAST SPIN RATE OF THE SATELLITE,
THE SLOW SAMPLE RATE OF THE DATA, AND THE RESULTING ALIASING
PROBLEMS DEGRADED THE DATA IN THE SPIN PLANE. THE MAGNETOMETER
ITSELF HAD OPERATED SATISFACTORILY SINCE LAUNCH AND HAD ABOUT
A 50 PERCENT COVERAGE UP TO THE TIME WHEN REGULARLY SCHEDULED
DATA ACQUISITION WAS DISCONTINUED.

***** ATS 6 *****

SPACECRAFT COMMON NAME- ATS 6
ALTERNATE NAMES- PL-721A, ATS-F
NSSDC ID- 74-039A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 05/30/74.

LAUNCH DATE- 05/30/74 SPACECRAFT WEIGHT- 930. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN 3C

SPONSORING COUNTRY/AGENCY NASA-ON
UNITED STATES

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 05/30/74
ORBIT PERIOD- 1440. MIN INCLINATION- 1.82 DEG
PERIAPEIS- 42157. KM ALT APOAPEIS- 42161. KM ALT

RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 05/30/74
ORBIT PERIOD- 1440. MIN INCLINATION- 1.82 DEG
PERIAPEIS- 42157. KM ALT APOAPEIS- 42160. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - A.H. SABLHAUSNASA-GSFC
GREENBELT, MD
PS - E.A. WELFNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE PRIMARY OBJECTIVES OF ATS 6 (APPLICATIONS TECHNOLOGY
SATELLITE) WERE TO ERCT IN ORBIT A LARGE HIGH-GAIN STEERABLE
ANTENNA STRUCTURE CAPABLE OF PROVIDING A GOOD QUALITY TV
SIGNAL TO A GROUND-BASED RECEIVER AND TO MEASURE AND EVALUATE
THE PERFORMANCE OF SUCH AN ANTENNA. A SECONDARY OBJECTIVE WAS
TO DEMONSTRATE NEW CONCEPTS IN SPACE TECHNOLOGY IN THE AREAS
OF AIRCRAFT CONTROL, LASER COMMUNICATIONS, AND VISUAL AND
INFRARED MAPPING OF THE EARTH/ATMOSPHERE SYSTEM. THE
SPACECRAFT WAS ALSO CAPABLE OF (1) MEASURING RADIO FREQUENCY
INTERFERENCE IN SHARED FREQUENCY BANDS AND PROPAGATION
CHARACTERISTICS OF MILLIMETER WAVES, (2) PERFORMING
SPACECRAFT-TO-SPACECRAFT COMMUNICATION AND TRACKING
EXPERIMENTS, AND (3) MAKING PARTICLE AND RADIATION
MEASUREMENTS OF THE GEOSYNCHRONOUS ENVIRONMENT. CONFIGURED
SOMEWHAT LIKE AN OPEN PARASOL, THE ATS 6 SPACECRAFT CONSISTED
OF FOUR MAJOR ASSEMBLIES - (1) A 9.15-M-DIAM DISH ANTENNA,
(2) TWO SOLAR CELL PADDOLES MOUNTED AT RIGHT ANGLES TO EACH
OTHER ON OPPOSITE SIDES OF AN UPPER EQUIPMENT MODULE, (3) AN
EARTH-VIEWING EQUIPMENT MODULE (EVM) CONNECTED BY A TUBULAR
MAST TO THE UPPER EQUIPMENT MODULE, AND (4) AN ATTITUDE
CONTROL AND STABILIZATION SYSTEM. THE EVM, IN ADDITION TO
HOUSING THE EARTH-VIEWING EXPERIMENTS, PROVIDED SUPPORT FOR
THE PROPULSION SYSTEM AND TANKS, BATTERIES, A MULTIFREQUENCY
TRANSPONDER, AND THE TELEMETRY, COMMAND, AND THERMAL CONTROL
SYSTEMS. THE UPPER EQUIPMENT MODULE PROVIDED A PLATFORM FOR
THE SPACE-VIEWING EXPERIMENTS. INERTIA WHEELS WERE THE PRIME
MEANS FOR TROUING THE SPACECRAFT, WITH BOTH HYDRAZINE AND
AMMONIA MULTIJET THRUSTER SYSTEMS INCLUDED TO PROVIDE THE
NECESSARY TORQUES FOR UNLOADING THE WHEELS. ALSO INCLUDED WAS
A SMALL ENVIRONMENT MEASUREMENT PACKAGE CONTAINING A
MAGNETOMETER AND SEVERAL PARTICLE EXPERIMENTS. OPERATION OF
THE SPACECRAFT HAS BEEN SUCCESSFUL FROM LAUNCH. THE SATELLITE
IS LOCATED AT 94.41 DEG W LONGITUDE.

----- ATS 6. COLEMAN, JR. -----

EXPERIMENT NAME- MAGNETOMETER EXPERIMENT

NSSDC ID- 74-039A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 05/30/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P.J. COLEMAN, JR.U OF CALIF. LA
LOS ANGELES, CA
OI - W.D. CUMMINGSGRANDLING COLLEGE
GRANDLING, LA

EXPERIMENT BRIEF DESCRIPTION

THE MAGNETIC FIELD AT SYNCHRONOUS ALTITUDE WAS MEASURED
WITH THREE ORTHOGONAL FLUXGATE MAGNETOMETERS MOUNTED
SYMMETRICALLY WITH RESPECT TO THE SOLAR PANELS ON A 5-M BOOM.
SINCE THE SPACECRAFT DIMENSIONS INCLUDING THE ANTENNA AND
SOLAR PANELS WERE LARGER THAN THE BOOM DIMENSIONS, IT WAS
EXPECTED THAT THE MAGNETOMETER RESIDED IN A SIGNIFICANT
SPACECRAFT FIELD. THE INSTRUMENT OPERATED BY PROVIDING
BIASING COILS TO NULL THE MAGNETIC FIELD TO WITHIN PLUS OR
MINUS 32 GAMMA, AND THE REMAINING FIELD WAS DIGITIZED TO 1/16
GAMMA. EIGHT VECTOR SAMPLES WERE TELEMETED PER SEC. THE
INSTRUMENT OPERATED WITH A LOW-PASS DIGITAL FILTER TO REMOVE
THE ALIASING EFFECT. THE 20-DB POINT OF THE FILTER WAS
VARIABLE BY GROUND COMMAND AND WAS 1.4, 0R 12.42. THERE WAS
ALSO AN INFLIGHT CALIBRATION MECHANISM. THE INSTRUMENT HAS
PERFORMED NOMINALLY SINCE LAUNCH (11/11/74).

----- ATS 6. DAVIES -----

EXPERIMENT NAME- RADIO BEACON

NSSDC ID- 74-039A-09

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/01/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K. DAVIESNOAA-ERL
BOULDER, CO
OI - R.D. FRITZNOAA-ERL
BOULDER, CO
OI - R.N. GRUNDNOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO STUDY VARIATIONS
OF IONOSPHERIC PARAMETERS (TOTAL ELECTRON CONTENT,
SCINTILLATION, IRREGULARITIES, AND ADSORPTION) WITH TIME AND
SOLAR AND MAGNETIC ACTIVITY, AND TO STUDY THE RELATION OF
THESE VARIATIONS TO IONOSPHERIC PROCESSES. THE RADIO BEACON
EXPERIMENT PROVIDED THREE COHERENT CARRIER FREQUENCIES
(40.0160 MHZ, 140.056 MHZ AND 360.1440 MHZ) FOR INVESTIGATION
OF PARTICLES AFFECTING RADIO PROPAGATION. THE BEACON WAS
DESIGNED FOR SEVERAL TYPES OF MEASUREMENTS, PRINCIPALLY
FARADAY ROTATION, DIFFERENTIAL PHASE (DOPPLER), PHASE AND
AMPLITUDE SCINTILLATION, AND SIGNAL AMPLITUDE (ABSORPTION).
THE 40-MHZ CARRIER WAS AMPLITUDE STABILIZED TO ENABLE ACCURATE
ABSORPTION MEASUREMENTS TO BE MADE. DIFFERENTIAL FARADAY
MEASUREMENTS WERE POSSIBLE WITH CARRIERS AND SIDEBANDS. THE
MODE OF OPERATION CALLED FOR CONTINUOUS EMISSION ON ALL
FREQUENCIES. RESEARCH ORGANIZATIONS FROM A NUMBER OF
COUNTRIES CONDUCTED STUDIES OF THE RADIO BEACON USING GROUND
RECEIVERS BASED ON A UNIT DESIGNED BY THE NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION. GROUND STATIONS RANGING FROM
COMPUTER-CONTROLLED UNITS TO SIMPLE MANUAL UNITS WERE LOCATED
AT POINTS IN NORTH AND SOUTH AMERICA, EUROPE, THE MIDDLE EAST,
INDIA, AND AFRICA. MANY OF THE UNITS WERE MOBILE AND MOVED
FROM CONTINENT TO CONTINENT TO KEEP THE SPACECRAFT ALONG THE
EQUATOR. INITIAL OPERATION OF THIS EXPERIMENT WAS NOMINAL.

----- ATS 6. FRITZ -----

EXPERIMENT NAME- MEASUREMENT OF LOW-ENERGY PROTONS

NSSDC ID- 74-039A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/10/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.A. FRITZNOAA-ERL
BOULDER, CO
OI - A. KONRADNASA-JSC
HOUSTON, TX
OI - D.J. WILLIAMSNOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

SOLID-STATE DETECTORS MEASURED THE DIRECTIONAL FLUXES OF
PROTONS IN THE RANGE OF 20- TO 300-KEV IN SIX ENERGY STEPS.

----- ATS 6. HASLEY -----

EXPERIMENT NAME- SOLAR COSMIC RAYS AND GEOMAGNETICALLY
TRAPPED RADIATION

NSSDC ID- 74-039A-34

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/14/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.J. MASLEYMCDONNELL-DOUGLAS CORP
HUNTINGTON BEACH, CA
DI - P.R. SATTERBLOWMCDONNELL-DOUGLAS CORP
HUNTINGTON BEACH, CA

EXPERIMENT BRIEF DESCRIPTION
TWO SOLID-STATE TELESCOPES, ONE DIRECTED PERPENDICULAR
TO AND THE OTHER DIRECTED PARALLEL TO THE LOCAL MAGNETIC FIELD
DIRECTION, EACH MEASURED PROTONS FROM 0.2 TO 300 MEV IN 12
ENERGY INTERVALS AND ALPHA PARTICLES FROM 1.2 TO 180 MEV IN 10
ENERGY INTERVALS. TWO MAGNETIC ELECTRON SPECTROMETERS,
ORIENTED PARALLEL TO THE TWO TELESCOPES, MEASURED ELECTRONS
FROM 50 TO 800 KEV IN FOUR ENERGY INTERVALS.

----- ATS 6. MCILWAIN -----

EXPERIMENT NAME- AURORAL PARTICLES EXPERIMENT

NSSDC ID- 74-039A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/15/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.E. MCILWAINU OF CALIF, SAN DIEGO
SAN DIEGO, CA
DI - R.W. FILLIUSU OF CALIF, SAN DIEGO
SAN DIEGO, CA

EXPERIMENT BRIEF DESCRIPTION
A QUADRISPHERICAL ELECTROSTATIC ANALYZER AND ASSOCIATED
CHANNELTRON MEASURED ELECTRONS AND PROTONS FROM THERMAL
ENERGIES TO 70 KEV IN 62 OVERLAPPING STEPS OVER A RANGE OF
DIFFERENT PITCH ANGLES.

----- ATS 6. PAULIKAS -----

EXPERIMENT NAME- OMNIDIRECTIONAL SPECTROMETER

NSSDC ID- 74-039A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/14/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.B. PAULIKASAEROSPACE CORP
EL SEGUNDO, CA
DI - J.B. BLAKEAEROSPACE CORP
EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WAS TO MEASURE THE
OMNIDIRECTIONAL FLUXES AND SPECTRA OF ELECTRONS AND PROTONS.
FOUR DETECTORS COUNTED PROTONS FROM 2 OR 3 TO 10 MEV, 10 TO 21
MEV, 20 TO 40 MEV, AND 40 TO 80 MEV. THEY ALSO COUNTED,
RESPECTIVELY, ELECTRONS OF ENERGIES GREATER THAN 80 KEV AND
250 KEV, 600 KEV, 1.2 MEV, AND 4 MEV.

----- ATS 6. WINCKLER -----

EXPERIMENT NAME- PARTICLE ACCELERATION MECHANISMS AND
DYNAMICS OF THE OUTER TRAPPING REGION

NSSDC ID- 74-039A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/14/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.R. WINCKLERU OF MINNESOTA
MINNEAPOLIS, MN
DI - G.K. PARKSU OF WASHINGTON
SEATTLE, WA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT INVESTIGATED THE ORIGIN OF THE VAN ALLEN
TRAPPED RADIATION. IT CONSISTED OF A MAGNETIC DEPLETION
SEPARATION SYSTEM AND A SOLID-STATE PARTICLE COUNTER SYSTEM.
THE PARTICLE COUNTERS HAD DIRECTIONAL CAPABILITIES SO THAT
PARTICLE PITCH ANGLES COULD BE DETERMINED. THE SYSTEM
RESPONDED TO PROTONS IN THE RANGES 20 TO 50 KEV, 50 TO 150
KEV, AND 150 TO 500 KEV, AND TO ELECTRONS IN THE RANGES 20 TO
40 KEV, 100 TO 200 KEV, AND 1.0 TO 1.5 MEV.

***** CAS-C *****

SPACECRAFT COMMON NAME- CAS-C
ALTERNATE NAMES- COOPERATIVE APPLICA SAT., CTS
CANADIAN TECHNOLOGY SAT.
NSSDC ID- CAS-C

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 4 QTR 75 SPACECRAFT WEIGHT- KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
CANADA CRC
UNITED STATES NASA-DA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERIOD- MIN

PERIAPSIS- 29622.0 KM ALT

INCLINATION- DEG

APPOPSIS- 29622.0 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT IS DESIGNED AS A TEST VEHICLE TO SUPPORT
TECHNOLOGICAL EXPERIMENT RELATING TO A HIGH-FREQUENCY
COMMUNICATIONS SATELLITE. EXPERIMENTS WILL INCLUDE A 1.2-GHZ
COMMUNICATIONS TV AND VOICE COMMUNICATIONS EXPERIMENTAL SYSTEM
DESIGNED TO SERVE ISOLATED AND OR SMALL COMMUNITIES, A
TRANSMITTER POWER TUBE TEST, A SOLAR CELL ARRAY TEST, AN
ELECTRIC SPACECRAFT PROPULSION TEST, AND A SPECIALIZED
SPACECRAFT STABILIZATION SYSTEM TEST. THE SATELLITE IS TO BE
INSERTED IN GEOSYNCHRONOUS ORBIT IN 1974.

***** CORSA *****

SPACECRAFT COMMON NAME- CORSA

ALTERNATE NAMES- COSMIC RAY SATELLITE

NSSDC ID- CORSA

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- 4 QTR 75 SPACECRAFT WEIGHT- 70. KG
LAUNCH SITE- KAGOSHIMA, JAPAN
LAUNCH VEHICLE- M-3S-C

SPONSORING COUNTRY/AGENCY
JAPAN T.KYUB U

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERIOD- MIN

PERIAPSIS- 350. KM ALT

INCLINATION- 30. DEG

APPOPSIS- 600. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - M. ODAU OF TOKYO
TOKYO, JAPAN
PS - S. HAYAKAWANAGOYA U
NAGOYA, JAPAN

SPACECRAFT BRIEF DESCRIPTION

THE OBJECTIVES OF THE COSMIC RADIATION SATELLITE, CORSA,
ARE TO MAKE MEASUREMENTS OF COSMIC X RAYS AND HEAVY PRIMARY
PARTICLES. THESE ARE REDUCED GOALS RELATIVE TO THE ORIGINAL
PROGRAM, WHICH WAS THE MEASUREMENT OF COSMIC X RAYS, GAMMA
RAYS, ALPHA PARTICLES, AND HEAVY NUCLEI. AN ENGINEERING MODEL
OF THE SATELLITE INCORPORATING ALL FOUR EXPERIMENT PACKAGES
WAS CONSTRUCTED AND EVALUATED IN 1971-72. ON THE BASIS OF THE
STUDY OF THE ENGINEERING MODEL, A DECISION WAS MADE IN 1973 TO
CANCEL THE GAMMA-RAY AND ALPHA PARTICLE EXPERIMENT PACKAGES.
THE X-RAY DETECTORS ARE TO BE POSITIONED SO THAT THEY MAY VIEW
THE SKY IN TWO ORTHOGONAL DIRECTIONS, I.E., PARALLEL AND
PERPENDICULAR TO THE SPIN AXIS OF THE SATELLITE. THE
OBSERVATIONS WILL COVER THE ENERGY INTERVAL FROM 0.25 KEV TO
40 KEV. THE COSMIC RAY HEAVY PARTICLE TELESCOPE WILL
DETERMINE THE NUCLEAR CHARGE OF THE PRIMARIES AND FOR EACH
SPECIES GIVE DATA ON THE INTEGRAL ENERGY SPECTRUM OVER THE
RANGE FROM 3 TO 6 GEV. CORSA WILL HAVE A CYLINDRICAL SHAPE
WITH A DIAMETER OF 05 CM AND A HEIGHT OF APPROXIMATELY 90 CM.
THE SPACECRAFT WILL BE SPIN STABILIZED, WITH THE ORIENTATION
OF THE AXIS CONTROLLABLE BY COMMAND. A TOTAL ELECTRIC POWER
OF APPROXIMATELY 15 WATTS WILL BE PROVIDED BY 6000 SOLAR
CELLS MOUNTED ON THE SIDE SURFACE OF THE SATELLITE. A SUN SENSOR
AND HORIZON SENSOR WILL BE UTILIZED AS ASPECT-METER. AN
ONBOARD CORE MEMORY OF 4000 EIGHT-BIT WORDS IS TO BE USED TO
STORE THE DATA DURING THE TIME WHEN THE SATELLITE IS OUT OF
RANGE OF GROUND TELEMETRY STATIONS. THE PROPOSED ORBIT IS
NEARLY CIRCULAR AT AN ALTITUDE OF ABOUT 500 KM AND WITH AN
INCLINATION OF 30 DEGREES.

----- CORSA, HAYAKAWA -----

EXPERIMENT NAME- COSMIC X-RAY DETECTION (0.25 - 60 KEV)

NSSDC ID- CORSA -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S. HAYAKAWANAGOYA U
NAGOYA, JAPAN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE FOR THE DETECTION OF COSMIC X
RAYS. THERE WILL BE TWO SETS OF TWO UNITS OF GAS-FILLED
PROPORTIONAL COUNTERS THAT CAN MEASURE VERY-SOFT AND SOFT X
RAYS. THESE TWO SETS WILL BE POSITIONED WITHIN THE SATELLITE
TO VIEW THE SKY IN TWO ORTHOGONAL DIRECTIONS, PARALLEL AND
PERPENDICULAR TO THE SPIN AXIS WHICH WILL BE CONTROLLABLE BY
COMMAND. THEREFORE MEASUREMENTS WILL BE ABLE TO BE MADE OF
ANY INTERESTING X-RAY OBJECT ON THE CELESTIAL SPHERE. IN
ADDITION, THERE WILL BE ONE SCINTILLATION COUNTER ON THE
SATELLITE FOR THE DETECTION OF HARD X RAYS. THE FULL X-RAY
INSTRUMENTATION PACKAGE WILL BE ABLE TO DETECT X RAYS OVER THE
INTERVAL FROM 0.25 KEV TO 60 KEV, AND WITH A TIME RESOLUTION
UP TO 1.3 MSEC.

----- COSA, ODA -----

EXPERIMENT NAME- COSMIC HEAVY PRIMARY PARTICLES

NSSDC ID- COSA -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - M. ODAU OF TOKYO
TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS TO MEASURE COSMIC-RAY HEAVY PRIMARY PARTICLES USING A SOLID-STATE PARTICLE TELESCOPE. THE NUCLEAR CHARGE OF PARTICLE WILL BE RESOLVED IN THE ENERGY RANGE FROM 3 TO 6 GEV.

***** COS-B *****

SPACECRAFT COMMON NAME- COS-B

ALTERNATE NAMES- COSMIC RAY SATELLITE-B, PL-7410

NSSDC ID- COS-B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 3 QTR 75 SPACECRAFT WEIGHT- 100. KG

LAUNCH SITE-

LAUNCH VEHICLE- EUROPA 2

SPONSORING COUNTRY/AGENCY
INTERNATIONAL ESRO

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 2230. MIN INCLINATION- 20. DEG
PERIAPSIS- 350.000 KM ALT APOAPSIS- 100000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST,
SPACECRAFT BRIEF DESCRIPTION

THE COS-B SPACECRAFT WILL BE USED PRIMARILY TO STUDY EXTRATERRESTRIAL GAMMA RADIATION. THE OBJECTIVES OF THE COS-B MISSION WILL BE (1) TO ESTABLISH THE INTENSITY OF THE AVERAGE GAMMA-RAY FLUX, (2) TO EXAMINE THE LARGE-SCALE ANISOTROPY OF RADIATION OVER ANGULAR REGIONS CORRESPONDING TO GALACTIC FEATURES, (3) TO SEARCH FOR AND EXAMINE RADIO AND X-RAY SOURCES OF SMALL ANGULAR SIZE, ESPECIALLY THOSE SUCH AS SUPERNOVA REMNANTS AND QUASARS, (4) TO MEASURE THE ENERGY SPECTRA OF THE RADIATION, AND (5) TO SEARCH FOR LONG-TERM TIME VARIATIONS, AS OBSERVED IN SOME X-RAY SOURCES, AND FOR THE SHORT-TERM VARIATIONS CHARACTERISTIC OF PULSARS. THE CYLINDRICAL SPACECRAFT WILL BE SPIN STABILIZED, WITH THE GAMMA-RAY TELESCOPE ORIENTED ALONG THE SPACECRAFT SPIN AXIS. THE SPACECRAFT WILL BE LAUNCHED INTO A HIGHLY ECCENTRIC ORBIT SO THAT IT WILL SPEND MOST OF THE TIME OUTSIDE THE RADIATION BELTS.

***** DADE-A *****

SPACECRAFT COMMON NAME- DADE-A

ALTERNATE NAMES- DUAL AIR DENSITY EXPL-A, DAD
AD-1

NSSDC ID- DADE-A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 2HALF 75 SPACECRAFT WEIGHT- 40. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES

LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 122. MIN INCLINATION- 90. DEG
PERIAPSIS- 400. KM ALT APOAPSIS- 1500. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.E. CANADY, JR.NASA-LARC
HAMPTON, VA

PS - E.J. PRIORNASA-LARC
HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION

THE EXPERIMENT AD-A (DUAL AIR DENSITY EXPLORER A) WILL CONSIST OF A 76-CM-DIAM SPHERE DESIGNED TO YIELD GLOBAL DENSITY MEASUREMENTS OF THE UPPER THERMOSPHERE. THIS EXPERIMENT WILL BE PLACED IN A COPLANAR ORBIT WITH THE SECOND SATELLITE IN THE SYSTEM, AD-B (DUAL AIR DENSITY EXPLORER B), USING A SINGLE SCOUT LAUNCH VEHICLE. VALUES OF ATMOSPHERIC DENSITY WILL BE OBTAINED FROM SATELLITE DRAG ANALYSIS NEAR PERIGEE (APPROXIMATELY 400 KM), AND FROM COMPOSITION MEASUREMENTS TAKEN BY AN ONBOARD MASS SPECTROMETER. THE SATELLITE WILL BE EQUIPPED WITH A RADIO BEACON TO FACILITATE TRACKING. ALL DATA WILL BE TELEMETRED IN REAL TIME.

***** DADE-A, KEATING *****

EXPERIMENT NAME- ATMOSPHERIC DRAG DENSITY

NSSDC ID- DADE-A -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.M. KEATINGNASA-LARC
HAMPTON, VA

OI - E.J. PRIORNASA-LARC
HAMPTON, VA

OI - J.A. MULLINSNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERIC DRAG DENSITY EXPERIMENT ON AD-A IS DESIGNED TO PROVIDE INDIRECT MEASUREMENTS OF UPPER THERMOSPHERIC DENSITY NEAR SATELLITE PERIGEE (APPROXIMATELY 400 KM). THE EXPERIMENT WILL HAVE NO UNIQUE ONBOARD HARDWARE. THE DENSITY VALUES WILL BE DERIVED FROM SEQUENTIAL OBSERVATIONS OF THE SATELLITE'S POSITION. THE EXPERIMENT WILL YIELD SYSTEMATIC VALUES OF ATMOSPHERIC DENSITY AS A FUNCTION OF LATITUDE, SEASON, AND LOCAL SOLAR TIME.

***** DADE-A, NIER *****

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION MASS
SPECTROMETER

NSSDC ID- DADE-A -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.O. CNIERU OF MINNESOTA
MINNEAPOLIS, MN

OI - K. HAUERSBERGERU OF MINNESOTA
MINNEAPOLIS, MN

OI - E.J. PRIORNASA-LARC
HAMPTON, VA

OI - J.A. MULLINSNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THE MASS SPECTROMETER EXPERIMENT TO BE FLOWN ON AD-A IS DESIGNED TO PERFORM COMPOSITION MEASUREMENTS IN THE UPPER THERMOSPHERE (APPROXIMATELY 400 KM). THE INSTRUMENT WILL BE A DOUBLE-FOCUSING MATTAUCH-HERZOG SPECTROMETER, AND WILL MEASURE THE DISTRIBUTION OF SUCH ATMOSPHERIC CONSTITUENTS AS OXYGEN, NITROGEN, HELIUM, HYDROGEN, NEON, AND ARGON. ALL DATA WILL BE TRANSMITTED IN REAL TIME.

***** DADE-B *****

SPACECRAFT COMMON NAME- DADE-B

ALTERNATE NAMES- DUAL AIR DENSITY EXPL-B, DAD
AD-2

NSSDC ID- DADE-B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 2HALF 75 SPACECRAFT WEIGHT- 43. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES

LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 122. MIN INCLINATION- 90. DEG
PERIAPSIS- 400. KM ALT APOAPSIS- 1500. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.E. CANADY, JR.NASA-LARC
HAMPTON, VA

PS - E.J. PRIORNASA-LARC
HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION

THE EXPERIMENT AD-B (DUAL AIR DENSITY EXPLORER-B) WILL CONSIST OF A 3.66-M INFLATABLE SPHERE DESIGNED TO YIELD GLOBAL DENSITY MEASUREMENTS OF THE LOWER EXOSPHERE. THIS EXPERIMENT WILL BE PLACED IN A COPLANAR ORBIT WITH AD-A (DUAL AIR DENSITY EXPLORER-A), THE OTHER SATELLITE IN THE SYSTEM, BY A SINGLE SCOUT LAUNCH VEHICLE. VALUES OF ATMOSPHERIC DENSITY WILL BE OBTAINED FROM SATELLITE DRAG ANALYSIS NEAR PERIGEE (APPROXIMATELY 400 KM), AND FROM COMPOSITION MEASUREMENTS TAKEN BY AN ONBOARD MASS SPECTROMETER. THE SATELLITE WILL BE EQUIPPED WITH A RADIO BEACON TO FACILITATE TRACKING. ALL DATA WILL BE TELEMETRED IN REAL TIME.

***** DADE-B, KEATING *****

EXPERIMENT NAME- ATMOSPHERIC DRAG DENSITY

NSSDC ID- DADE-B -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.M. KEATINGNASA-LARC
HAMPTON, VA

OI - E.J. PRIORNASA-LARC
HAMPTON, VA

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

01 - J.A. MULLINSNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THE ATMOSPHERIC DRAG DENSITY EXPERIMENT ON AD-B IS DESIGNED TO PROVIDE INDIRECT MEASUREMENTS OF LOWER EXOSPHERIC DENSITY NEAR SATELLITE PERIGEE (APPROXIMATELY 400 KM). THE EXPERIMENT WILL HAVE NO UNIQUE ONBOARD HARDWARE. THE DENSITY VALUES WILL BE DERIVED FROM SEQUENTIAL OBSERVATIONS OF THE SATELLITE'S POSITION. THE EXPERIMENT WILL YIELD SYSTEMATIC VALUES OF ATMOSPHERIC DENSITY AS A FUNCTION OF LATITUDE, SEASON, AND LOCAL SOLAR TIME.

----- DADE-B, NIER -----

EXPERIMENT NAME- ATMOSPHERIC COMPOSITION MASS
SPECTROMETER

NSSDC ID- DADE-B --02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.O.C. NIERU OF MINNESOTA
MINNEAPOLIS, MN

DI - K. MAUENBERGERU OF MINNESOTA
MINNEAPOLIS, MN

DI - E.J. PRIORNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THE MASS SPECTROMETER EXPERIMENT TO BE FLOWN ON AD-B WILL PERFORM COMPOSITION MEASUREMENTS IN THE LOWER EXOSPHERE (APPROXIMATELY 400 KM). THE INSTRUMENT IS A DOUBLE-FOCUSING MATTAUCH-HERZOG SPECTROMETER AND WILL MEASURE THE DISTRIBUTION OF SUCH ATMOSPHERIC CONSTITUENTS AS OXYGEN, NITROGEN, HELIUM, HYDROGEN, NEON, AND ARGON. ALL DATA WILL BE TRANSMITTED IN REAL TIME.

***** DIAPD *****

SPACECRAFT COMMON NAME- DIAPD

ALTERNATE NAMES-
NSSDC ID- DIAPD

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- 12/00/75 SPACECRAFT WEIGHT- KG
LAUNCH SITE- KOUROR, FRENCH GUIANA, FRANCE
LAUNCH VEHICLE- DIAMANT

SPONSORING COUNTRY/AGENCY
FRANCE

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN INCLINATION- 90. DEG
PERIAPSIS- 300. KM ALT APOAPSIS- 2500. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN

PS - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION

THIS SATELLITE WILL BE PART OF FRANCE'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. ITS OBJECTIVES WILL BE TO STUDY THE ORIGIN AND ACCELERATION MECHANISMS OF MAGNETOSPHERIC IONS (1) BY MEASURING THE RELATIVE ABUNDANCES AND THE ANGULAR AND ENERGY DISTRIBUTION OF SINGLY IONIZED HYDROGEN AND HELIUM, DOUBLY IONIZED HELIUM, AND OXYGEN (2 PLUS) IONS AND (2) BY COMPARING THE RESULTS WITH THE IONOSPHERIC AND SOLAR WIND COMPOSITION. ADDITIONALLY, A STUDY OF MAGNETOSPHERIC SUBSTORMS IS PLANNED WITH MEASUREMENTS OF THE ANGULAR AND ENERGY DISTRIBUTION OF ELECTRONS FROM 50 EV TO 1 MEV, COMPLEMENTED WITH VLF AND MAGNETIC FIELD MEASUREMENTS.

***** DUAL-A *****

SPACECRAFT COMMON NAME- DUAL-A

ALTERNATE NAMES-
NSSDC ID- DUAL-A

LAST REPORTED STATE- NO REPORT

LAUNCH DATE- 08/00/75 SPACECRAFT WEIGHT- KG
LAUNCH SITE-
LAUNCH VEHICLE- UNDISC

SPONSORING COUNTRY/AGENCY
U.S.S.R.

PLANNED ORBIT PARAMETERS

ORBIT TYPE- INCLINATION- DEG
ORBIT PERIOD- APOAPSIS-
PERIAPSIS-

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION

TWO SATELLITES, DUAL-A AND DUAL-A1, WILL BE LAUNCHED SIMULTANEOUSLY BY THE U.S.S.R. AND WILL BE PLACED IN ELONGATED ORBITS WITH THE DIRECTION OF THE LINE OF APSES TOWARD THE NEUTRAL POINTS OF THE MAGNETOSPHERE. THE SATELLITES WILL BE PART OF THE U.S.S.R. CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THEY WILL PERFORM OBSERVATIONS SIMULTANEOUSLY IN CRITICAL REGIONS OF THE EARTH'S PLASMA ENVIRONMENT. THE INSTRUMENTATION WILL INCLUDE MAGNETOMETERS AND PLASMA AND ENERGETIC PARTICLE DETECTORS.

***** DUAL-A1 *****

SPACECRAFT COMMON NAME- DUAL-A1

ALTERNATE NAMES-
NSSDC ID- DUAL-A1

LAST REPORTED STATE- NO REPORT

LAUNCH DATE- 08/00/75 SPACECRAFT WEIGHT- KG
LAUNCH SITE-
LAUNCH VEHICLE- UNDISC

SPONSORING COUNTRY/AGENCY
U.S.S.R.

PLANNED ORBIT PARAMETERS

ORBIT TYPE- INCLINATION- DEG
ORBIT PERIOD- APOAPSIS-
PERIAPSIS-

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION

TWO SATELLITES, DUAL-A AND DUAL-A1, WILL BE LAUNCHED SIMULTANEOUSLY BY THE U.S.S.R. AND WILL BE PLACED IN ELONGATED ORBITS WITH THE DIRECTION OF THE LINE OF APSES TOWARD THE NEUTRAL POINTS OF THE MAGNETOSPHERE. THE SATELLITES WILL BE PART OF THE U.S.S.R. CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THEY WILL PERFORM OBSERVATIONS SIMULTANEOUSLY IN CRITICAL REGIONS OF THE EARTH'S PLASMA ENVIRONMENT. THE INSTRUMENTATION WILL INCLUDE MAGNETOMETERS AND PLASMA AND ENERGETIC PARTICLE DETECTORS.

***** EOS-A *****

SPACECRAFT COMMON NAME- EOS-A

ALTERNATE NAMES- EARTH OBSERVATORY SAT.
NSSDC ID- EOS-A

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- 1979 SPACECRAFT WEIGHT- KG
LAUNCH SITE-
LAUNCH VEHICLE-

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC INCLINATION- 99. DEG
ORBIT PERIOD- 103. MIN APOAPSIS- 900. KM ALT
PERIAPSIS- 900. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN

PS - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION

THE EARTH OBSERVATORY SATELLITE (EOS) IS BEING DEVELOPED AS A FOLLOW-ON TO THE ERTS PROGRAM. IT WILL PROVIDE A SPACE PLATFORM FOR TESTING VARIOUS NEW SENSORS AND OTHER MEASUREMENT TECHNIQUES TO FACILITATE EARTH RESOURCES MANAGEMENT. THE SPACECRAFT IMAGE RESOLUTION IS EXPECTED TO BE 30 - 100 FT, COMPARED WITH THE 100-FT RESOLUTION ON ERTS-1. DESIGN OF THE SPACECRAFT WILL INVOLVE MODULAR SYSTEMS THAT CAN BE PLUGGED IN OR OUT EASILY SO THAT IT COULD BE SERVICED BY THE SPACE SHUTTLE.

***** ERTS I *****

SPACECRAFT COMMON NAME- ERTS I
ALTERNATE NAMES- EARTH RES TECH SAT.-A, PL-7244
ERTS-A, 06126

NSSDC ID- 72-058A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/23/72.

LAUNCH DATE- 07/23/72 SPACECRAFT WEIGHT- 891. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DA

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN
PERIAPSIS- 090.7 KM ALT

EPOCH DATE- 07/23/72
INCLINATION- 99.1253 DEG
APOAPSIS- 907. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 103.15 MIN
PERIAPSIS- 900.40 KM ALT

EPOCH DATE- 09/05/73
INCLINATION- 99.062 DEG
APOAPSIS- 914.37 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - S. WEILANDNASA-GSFC GREENBELT, MD
PS - W.P. NORDBERGNASA-GSFC GREENBELT, MD
PS - S.C. FREDENNASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE EARTH RESOURCES TECHNOLOGY SATELLITE (ERTS) 1 WAS A MODIFIED VERSION OF THE MINUS 4 METEOROLOGICAL SATELLITE. THE NEAR-POLAR ORBITING SPACECRAFT WAS DESIGNED TO SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR OBTAINING INFORMATION ON AGRICULTURAL AND FORESTRY RESOURCES, GEOLOGY AND MINERAL RESOURCES, HYDROLOGY AND WATER RESOURCES, GEOGRAPHY, CARTOGRAPHY, ENVIRONMENTAL POLLUTION, OCEANOGRAPHY AND MARINE RESOURCES, AND METEOROLOGICAL PHENOMENA. TO ACCOMPLISH THESE OBJECTIVES, THE SPACECRAFT WAS EQUIPPED WITH (1) A FOUR-CHANNEL MULTISPECTRAL SCANNER (MSS) AND A THREE-CAMERA RETURN BEAM VIDICON (RBV) TO OBTAIN BOTH VISIBLE AND INFRARED PHOTOGRAPHIC AND RADIOMETRIC IMAGES OF THE EARTH AND (2) A DATA COLLECTION SYSTEM TO COLLECT INFORMATION FROM REMOTE, INDIVIDUALLY EQUIPPED GROUND STATIONS AND TO RELAY THE DATA TO CENTRAL ACQUISITION STATIONS. ERTS 1 CARRIED TWO WIDE-BAND VIDEO TAPE RECORDERS (WVTR) CAPABLE OF STORING UP TO 30 MIN OF SCANNER OR CAMERA DATA TO GIVE THE SPACECRAFT'S SENSORS A NEAR-GLOBAL COVERAGE CAPABILITY. AN ADVANCED ATTITUDE CONTROL SYSTEM CONSISTING OF HORIZON SCANNERS, SUN SENSORS, AND A COMMAND ANTENNA COMBINED WITH A FREON GAS PROPULSION SYSTEM PERMITTED THE SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 0.7 DEG IN ALL THREE AXES. SPACECRAFT COMMUNICATIONS INCLUDED A COMMAND SUBSYSTEM OPERATING AT 154.2 AND 2106.4 MHZ AND A PULSE CODE MODULATED (PCM) NARROW-BAND TELEMETRY SUBSYSTEM, OPERATING AT 2287.5 AND 137.86 MHZ, FOR SPACECRAFT HOUSEKEEPING, ATTITUDE, AND SENSOR PERFORMANCE DATA. VIDEO DATA FROM THE THREE-CAMERA RBV SYSTEM WAS TRANSMITTED IN BOTH REAL-TIME AND TAPE RECORDER MODES AT 2285.5 MHZ, WHILE INFORMATION FROM THE MSS WAS CONSTRAINED TO A 20-MHZ RF BANDWIDTH AT 2285.5 MHZ. THE RBV WAS TURNED OFF 2 WEEKS AFTER LAUNCH WHEN AN EXCESSIVE POWER DRAIN WAS OBSERVED IN THE SPACECRAFT ELECTRICAL SYSTEM. ONE WVTR IS ALSO INOPERABLE.

----- ERTS 1, ARLUSKAS
EXPERIMENT NAME- MULTISPECTRAL SCANNER (MSS)

NSSDC ID- 72-058A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/23/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J. ARLUSKASNASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE ERTS 1 MULTISPECTRAL SCANNER (MSS) WAS DESIGNED TO PROVIDE REPETITIVE DAYTIME ACQUISITION OF HIGH-RESOLUTION, MULTISPECTRAL DATA OF THE EARTH'S SURFACE ON A GLOBAL BASIS AND TO DEMONSTRATE THAT REMOTE SENSING FROM SPACE IS A FEASIBLE AND PRACTICAL APPROACH TO EFFICIENT MANAGEMENT OF THE EARTH'S RESOURCES. IN ADDITION TO OBTAINING DATA FOR USE IN EARTH RESOURCE TYPE STUDIES, THE MSS SYSTEM WAS USED TO CONDUCT OCEANOGRAPHIC AND METEOROLOGICAL STUDIES, I.E., TO MAP SEA-ICE FILLS, LOCATE AND TRACK MAJOR OCEAN CURRENTS, MONITOR BOTH AIR AND WATER POLLUTION, DETERMINE SNOW COVER, INVESTIGATE SEVERE STORM ENVIRONMENTS, ETC. THE MSS CONSISTED OF A 22.86-CM DOUBBLE REFLECTION-TYPE TELESCOPE, SCANNING MIRROR, FILTERS, DETECTORS, AND ASSOCIATED ELECTRONICS. THE SCANNER OPERATED IN THE FOLLOWING SPECTRAL INTERVALS -- BAND 1: 0.5 TO 0.6 MICRON, BAND 2: 0.6 TO 0.7 MICRON, BAND 3: 0.7 TO 0.8 MICRON, AND BAND 4: 0.8 TO 1.1 MICRONS. INCOMING RADIATION WAS COLLECTED BY THE SCANNING MIRROR, WHICH OSCILLATED 2489 DEG TO EITHER SIDE OF RADIR AND SCANNED CROSS-TRACK SWATHS 189 KM WIDE. THE ALONG-TRACK SCAN WAS PRODUCED BY THE ORBITAL MOTION OF THE SPACECRAFT. SCAN WAS IMAGE PRODUCED AT THE IMAGE PLANE OF THE TELESCOPE WAS RELAYED BY USE OF FIBER OPTIC BUNDLES TO DETECTORS WHERE CONVERSION TO AN ELECTRONIC SIGNAL WAS ACCOMPLISHED. OPTICAL FILTERS WERE USED TO PRODUCE THE DESIRED SPECTRAL SEPARATION. SIX DETECTORS WERE EMPLOYED IN EACH OF THE FOUR SPECTRAL BANDS -- BANDS 1 THROUGH 3 USED PHOTOMULTIPLIER TUBES AS DETECTORS, AND BAND 4 USED SILICON PHOTOCONDUCTORS. A MULTIPLEXER INCLUDED IN THE MSS SYSTEM PROCESSED THE SCANNER'S 24 CHANNELS OF VIDEO DATA. THE DATA WERE TIME-MULTIPLEXED AND THEN CONVERTED TO A PULSE CODE MODULATED (PCM) SIGNAL BY AN A/D CONVERTER. THE DATA WERE THEN TRANSMITTED (2287.5 MHZ) DIRECTLY TO AN ACQUISITION STATION OR, IN THE CASE OF REMOTE ANALYSIS, STORED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK. THE NEXT TIME THE SPACECRAFT CAME WITHIN COMMUNICATION RANGE OF AN ACQUISITION STATION, DATA FROM THIS EXPERIMENT ARE HANDLED BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD, AND ARE AVAILABLE TO APPROVED INVESTIGATIONS AND AGENCIES THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED INDIVIDUALS MAY OBTAIN DATA

THROUGH THE EARTH RESOURCES DATA CENTER, DEPARTMENT OF THE INTERIOR, SIOUX FALLS, S.D.

----- ERTS 1, PAINTER

EXPERIMENT NAME- DATA COLLECTION SYSTEM (DCS)

NSSDC ID- 72-058A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/23/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.E. PAINTERNASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THE ERTS 1 DATA COLLECTION SYSTEM (DCS) WAS TO PROVIDE USERS WITH NEAR REAL-TIME DATA COLLECTED FROM VARIOUS REMOTE LOCATIONS. THE DCS WAS COMPOSED OF THREE DISTINCT SUBSYSTEMS -- (1) THE DATA COLLECTION PLATFORMS (DCP'S), (2) THE SATELLITE EQUIPMENT, AND (3) THE GROUND DATA CENTERS, WHICH INCLUDED REMOTE RECEIVING SITES AND THE GROUND DATA HANDLING SYSTEM AT GSFC. USE OF THE ERTS SPACEBORNE DCS PROVIDED A CONTINUAL FLOW OF INFORMATION TO BE USED FOR MANAGEMENT OF WILDLIFE, MARINE, AGRICULTURE, WATER, AND FORESTRY RESOURCES AND TO LEAD TO IMPROVED WEATHER FORECASTS, POLLUTION CONTROL, AND EARTHQUAKE PREDICTION AND WARNING. THE ENVIRONMENTAL SENSORS MOUNTED ON A DCP WERE SELECTED BY INDIVIDUAL INVESTIGATORS TO SATISFY THEIR PARTICULAR REQUIREMENTS. FROM A NOMINAL ORBIT OF APPROXIMATELY 900 KM, THE SPACECRAFT WAS CAPABLE OF ACQUIRING DATA FROM DCP'S WITHIN A RADIUS OF ABOUT 3100 KM FROM THE SATELLITE POINT, THUS ALLOWING DATA TO BE OBTAINED FROM ANY REMOTE PLATFORM AT LEAST ONCE EVERY 12 HR. THE DCP'S TRANSMITTER FREQUENCIES WERE 401.55 MHZ. LACKING INTERMODULATION CAPABILITIES, THE DCS EQUIPMENT IN THE SPACECRAFT WAS ESSENTIALLY A RECEIVER. THE DATA WERE SIMPLY RECEIVED AND RETRANSMITTED (AT 2287.5 MHZ) TO SELECTED GROUND RECEIVING STATIONS. THERE WAS NO SIGNAL MULTIPLEXING OR DATA PROCESSING ON THE SATELLITE. THE ERTS DCS WAS DESIGNED TO ACCOMMODATE UP TO 1000 DCP'S DEPLOYED THROUGHOUT THE CONTINENTAL UNITED STATES. HOWEVER, THE DCS INITIALLY CONSISTED OF A PILOT GROUP OF ONLY SIX DCP'S. WITH USER AGENCIES PROCURING, INSTRUMENTING, AND DEVELOPING ADDITIONAL PLATFORMS ACCORDING TO THEIR NEEDS. DATA FROM THIS EXPERIMENT ARE HANDLED AND DISTRIBUTED TO THE VARIOUS PLATFORM INVESTIGATORS BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD.

***** ERTS-B *****

SPACECRAFT COMMON NAME- ERTS-B
ALTERNATE NAMES- EARTH RES TECH SAT.-B, PL-733D
NSSDC ID- ERTS-B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 1 QTR 75 SPACECRAFT WEIGHT- 816. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 103. MIN INCLINATION- 99.088 DEG
PERIAPSIS- 912.000 KM ALT APOAPSIS- 912.000 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J. SARGENTNASA-GSFC GREENBELT, MD
PS - W.P. NORDBERGNASA-GSFC GREENBELT, MD
PS - S.C. FREDENNASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE EARTH RESOURCES TECHNOLOGY SATELLITE ERTS-B WILL BE A MODIFIED VERSION OF THE MINUS 4 METEOROLOGICAL SATELLITE. THE NEAR-POLAR ORBITING SPACECRAFT WILL SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR OBTAINING INFORMATION ON AGRICULTURAL AND FORESTRY RESOURCES, GEOLOGY AND MINERAL RESOURCES, HYDROLOGY AND WATER RESOURCES, GEOGRAPHY, CARTOGRAPHY, ENVIRONMENTAL POLLUTION, OCEANOGRAPHY AND MARINE RESOURCES, AND METEOROLOGICAL PHENOMENA. TO ACCOMPLISH THESE OBJECTIVES, THE SPACECRAFT WILL BE EQUIPPED WITH (1) A FOUR-CHANNEL MULTISPECTRAL SCANNER (MSS) AND A THREE-CAMERA RETURN BEAM VIDICON (RBV) TO OBTAIN BOTH VISIBLE AND INFRARED PHOTOGRAPHIC AND RADIOMETRIC IMAGES OF THE EARTH, (2) A DATA COLLECTION SYSTEM TO COLLECT INFORMATION FROM REMOTE, INDIVIDUALLY EQUIPPED GROUND STATIONS AND TO RELAY THE DATA TO CENTRAL ACQUISITION STATIONS. ERTS-B WILL CARRY TWO WIDE-BAND VIDEO TAPE RECORDERS (WVTR) CAPABLE OF STORING UP TO 30 MIN OF SCANNER OR CAMERA DATA TO GIVE THE SPACECRAFT'S SENSORS A NEAR-GLOBAL COVERAGE CAPABILITY. AN ADVANCED ATTITUDE CONTROL SYSTEM CONSISTING OF HORIZON SCANNERS, SUN SENSORS, AND A COMMAND ANTENNA COMBINED WITH A FREON GAS PROPULSION SYSTEM WILL PERMIT THE SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 0.7 DEG IN ALL THREE AXES. SPACECRAFT COMMUNICATIONS WILL INCLUDE A COMMAND SUBSYSTEM OPERATING AT 154.2 AND 2106.4 MHZ AND A PULSE CODE MODULATED (PCM) NARROW-BAND TELEMETRY SUBSYSTEM, OPERATING AT 2287.5 AND 137.86 MHZ, FOR SPACECRAFT HOUSEKEEPING, ATTITUDE, AND SENSOR PERFORMANCE DATA. VIDEO DATA FROM THE THREE-CAMERA RBV SYSTEM

WILL BE TRANSMITTED IN BOTH REAL TIME AND FROM THE WIDE-BAND RECORDER SYSTEM AT 2265.5 MHZ. WHILE INFORMATION FROM THE MSS WILL BE CONSTRAINED TO A 20-KHZ RF BANDWIDTH AT 2229.5 MHZ.

----- ERTS-B, ARLUSKAS -----

EXPERIMENT NAME- MULTISPECTRAL SCANNER (MSS)

NSSDC ID- ERTS-B -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J. ARLUSKASNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE ERTS-B MULTISPECTRAL SCANNER (MSS) WILL PROVIDE REPETITIVE DAY/NIGHT ACQUISITION OF HIGH-RESOLUTION MULTISPECTRAL DATA OF THE EARTH'S SURFACE ON A GLOBAL BASIS. WHILE ITS PRIMARY FUNCTION WILL BE TO OBTAIN INFORMATION IN VARIOUS AREAS SUCH AS AGRICULTURE, FORESTRY, GEOLOGY, AND HYDROLOGY, THE MSS SYSTEM WILL ALSO BE USED FOR OCEANOGRAPHIC AND METEOROLOGICAL PURPOSES, I.E., TO MAP SEA-ICE FIELDS, LOCATE AND TRACK MAJOR OCEAN CURRENTS, MONITOR BOTH AIR AND WATER POLLUTION, DETERMINE SNOW COVER, INVESTIGATE SEVERE STORM ENVIRONMENTS, ETC. THE MSS WILL CONSIST OF A 22.06-CM DOUBLE REFLECTOR-TYPE TELESCOPE, SCANNING MIRROR, FILTERS, DETECTORS, AND ASSOCIATED ELECTRONICS. THE SCANNER WILL OPERATE IN THE FOLLOWING SPECTRAL INTERVALS -- BAND 1 - 0.3 TO 0.6 MICRON, BAND 2 - 0.6 TO 0.7 MICRON, BAND 3 - 0.7 TO 0.8 MICRON, BAND 4 - 0.8 TO 1.1 MICRONS, AND BAND 5 - 10.0 TO 12.6 MICRONS. THIS LAST BAND, WHICH LIES IN THE THERMAL (EMISSION) PART OF THE SPECTRUM, WILL GIVE ERTS-B NIGHTTIME SENSING CAPABILITIES, A FEATURE LACKING IN THE MSS ON ERTS 1. INCOMING RADIATION WILL BE COLLECTED BY THE SCANNING MIRROR, WHICH WILL OSCILLATE 2.09 DEG TO EITHER SIDE OF NADIR AND SCAN CROSS-TRACK SWATHS 105 KM WIDE. THE ALONG-TRACK SCAN WILL BE PRODUCED BY THE ORBITAL MOTION OF THE SPACECRAFT. THE PRIMARY IMAGE PRODUCED AT THE IMAGE PLANE WILL BE RELAYED BY USE OF FIBER-OPTIC BUNDLES TO DETECTORS WHERE CONVERSION TO AN ELECTRONIC SIGNAL WILL BE ACCOMPLISHED. OPTICAL FILTERS WILL BE USED TO PRODUCE THE DESIRED SPECTRAL SEPARATION. SIX DETECTORS WILL BE EMPLOYED IN EACH OF THE FIRST FOUR SPECTRAL BANDS AND TWO IN THE FIFTH BAND -- BANDS 1 THROUGH 3 WILL USE PHOTOMULTIPLIER TUBES AS DETECTORS, BAND 4 WILL USE SILICON PHOTODIODES, AND BAND 5 WILL USE MERCURY-CADMIUM-TELLURIDE DETECTORS. A MULTIPLEXER INCLUDED IN THE MSS SYSTEM WILL DEPROCESS THE SCANNER'S 26 CHANNELS OF DATA. THESE DATA WILL BE TIME-MULTIPLEXED AND THEN CONVERTED TO A PULSE-CODE MODULATED (PCM) SIGNAL BY AN A/D CONVERTER. THE DATA WILL THEN BE TRANSMITTED (AT 2229.5 MHZ) DIRECTLY TO AN ACQUISITION STATION OR STORED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK RANGE OF AN ACQUISITION STATION. DATA FROM THIS EXPERIMENT WILL BE HANDLED BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD. AND WILL BE MADE AVAILABLE TO APPROVED INVESTIGATORS THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED INDIVIDUALS WILL BE ABLE TO OBTAIN DATA THROUGH THE EARTH RESOURCES DATA CENTER, DEPARTMENT OF THE INTERIOR, SIOUX FALLS, SD.

----- ERTS-B, PAINTER -----

EXPERIMENT NAME- DATA COLLECTION SYSTEM (DCS)

NSSDC ID- ERTS-B -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.E. PAINTERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE ERTS-B DATA COLLECTION SYSTEM (DCS) WILL PROVIDE USERS WITH NEAR REAL-TIME DATA COLLECTED FROM VARIOUS REMOTE LOCATIONS. THE DCS WILL BE COMPOSED OF THREE DISTINCT SUBSYSTEMS -- (1) THE DATA COLLECTION PLATFORMS (DCP'S), (2) THE SATELLITE EQUIPMENT, AND (3) THE GROUND DATA CENTERS, WHICH INCLUDE REMOTE RECEIVING SITES AND THE GROUND DATA HANDLING SYSTEM AT GSFC. USE OF THE ERTS SPACEBORNE DCS WILL PROVIDE A CONTINUAL FLOW OF INFORMATION FOR BETTER MANAGEMENT OF WILDLIFE, MARINE, AGRICULTURE, WATER, AND FORESTRY RESOURCES AND WILL LEAD TO IMPROVED WEATHER FORECASTS, POLLUTION CONTROL, AND EARTHQUAKE PREDICTION AND WARNING. THE ENVIRONMENTAL SENSORS TO BE MOUNTED ON A DCP WILL BE SELECTED BY INDIVIDUAL INVESTIGATORS TO SATISFY THEIR PARTICULAR REQUIREMENTS. FROM A PLANNED ORBIT OF 912 KM, THE SPACECRAFT WILL BE CAPABLE OF ACQUIRING DATA FROM DCP'S WITHIN A RADIUS OF 3143 KM FROM THE SATELLITE POINT, THUS ALLOWING DATA TO BE OBTAINED FROM ANY REMOTE PLATFORM AT LEAST ONCE EVERY 12 HR. THE DCP'S WILL TRANSMIT AT 401.95 MHZ. LACKING IN THE INTERROGATION CAPABILITIES, THE DCS EQUIPMENT IN THE SPACECRAFT IS ESSENTIALLY A RECEIVER. THE DATA WILL BE SIMPLY RECEIVED AND RETRANSMITTED (AT 2207.5 MHZ) TO SELECTED GROUND RECEIVING STATIONS. THERE WILL BE NO SIGNAL MULTIPLEXING OR DATA PROCESSING ON THE SATELLITE. THE ERTS DCS WILL BE DESIGNED TO ACCOMMODATE UP TO 1000 DCP'S DEPLOYED THROUGHOUT THE CONTINENTAL UNITED STATES. HOWEVER, THE DCS PROBABLY WILL CONSIST OF ONLY A SMALL NUMBER OF INITIAL DCP'S, AND USER AGENCIES WILL BE ABLE TO PROCURE, INSTRUMENT, AND DEVELOP

ADDITIONAL PLATFORMS ACCORDING TO THEIR NEEDS. DATA FROM THIS EXPERIMENT WILL BE HANDLED AND DISTRIBUTED TO THE VARIOUS PLATFORM INVESTIGATORS BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD.

----- ERTS-B, WEINSTEIN -----

EXPERIMENT NAME- RETURN BEAM VIDICON (RBV) CAMERA SYSTEM

NSSDC ID- ERTS-B -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D. WEINSTEINNASA-GSFC
GREENBELT, MD
OI - T.M. RAGLANDNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE ERTS-B RETURN BEAM VIDICON (RBV) CAMERA SYSTEM WILL CONTAIN THREE INDEPENDENT CAMERAS COVERING THE THREE SPECTRAL BANDS FROM BLUE-GREEN (0.47 TO 0.575 MICRON) THROUGH YELLOW-RED (0.58 TO 0.68 MICRON) TO NEAR INFRARED (0.69 TO 0.93 MICRON). WHILE DESIGNED PRIMARILY TO OBTAIN INFORMATION FOR EARTH RESOURCE TYPE STUDIES, THE RBV CAMERA SYSTEM WILL ALSO BE USED TO CONDUCT METEOROLOGICAL STUDIES, I.E., TO INVESTIGATE ATMOSPHERIC ATTENUATION AND TO OBSERVE MESOSCALE PHENOMENA. WINTER MONSOON CLOUDS (JAPAN), SNOW COVER, ETC. THE THREE EARTH-ORIENTED CAMERAS WILL BE MOUNTED TO A COMMON BASE, STRUCTURALLY ISOLATED FROM THE SPACECRAFT TO MAINTAIN ACCURATE ALIGNMENT. EACH CAMERA WILL CONTAIN AN OPTICAL LENS, A 5.06-CM RETURN BEAM VIDICON, A THERMOELECTRIC COOLER, DEFLECTION AND FOCUS COILS, A MECHANICAL SHUTTER, FRASE LAMPS, AND SENSOR ELECTRONICS. THE CAMERAS WILL BE SIMILAR EXCEPT FOR THE SPECTRAL FILTERS CONTAINED IN THE LENS ASSEMBLIES THAT PROVIDE SEPARATE SPECTRAL VIEWING REGIONS. THE VIEWED GROUND SCENE, 105 BY 105 KM IN AREA, WILL BE STORED ON THE PHOTOSENSITIVE SURFACE OF THE CAMERA TUBE, AND, AFTER SHUTTERING, THE IMAGE WILL BE SCANNED BY AN ELECTRON BEAM TO PRODUCE A VIDEO SIGNAL OUTPUT. EACH CAMERA WILL BE READ OUT SEQUENTIALLY, REQUIRING ABOUT 3.0 SEC FOR EACH OF THE SPECTRAL IMAGES. THE CAMERAS WILL BE RESHUTTERED EVERY 25 SEC TO PRODUCE OVERLAPPING IMAGES ALONG THE DIRECTION OF SPACECRAFT MOTION. VIDEO DATA FROM THE RBV WILL BE TRANSMITTED (AT 2265.5 MHZ) IN BOTH REAL-TIME AND TAPE RECORDER MODES. FROM A NOMINAL SPACECRAFT ALTITUDE OF 912 KM, THE RBV WILL HAVE A HORIZONTAL RESOLUTION OF ABOUT 0.7 KM. DATA FROM THIS EXPERIMENT WILL BE HANDLED BY THE NASA DATA PROCESSING FACILITY, GSFC, GREENBELT, MD, AND WILL BE MADE AVAILABLE TO APPROVED INVESTIGATORS AND AGENCIES THROUGH ITS ERTS USERS SERVICES SECTION. ALL OTHER INTERESTED INDIVIDUALS WILL BE ABLE TO OBTAIN DATA THROUGH THE EARTH RESOURCES DATA CENTER, DEPARTMENT OF THE INTERIOR, SIOUX FALLS, SD.

*****ESRO GEOS *****

SPACECRAFT COMMON NAME- ESRO GEOS
ALTERNATE NAMES- GEOS, ESRO
NSSDC ID- ESRO

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 2 QTR 76 SPACECRAFT WEIGHT- 260. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
INTERNATIONAL ESRO

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC INCLINATION- 1. DEG
ORBIT PERIOD- 1440. MIN APOAPSIS- 41578. KM ALT
PERTAPSIS- 41578. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.E. MULLINGERESRO-ESTEC
NOORDWIJK, NETHERLANDS
PS - K. KNOTTESRO-ESTEC
NOORDWIJK, NETHERLANDS

SPACECRAFT BRIEF DESCRIPTION
THE ESRO SPACECRAFT GEOS IS DESIGNED TO MAKE INTEGRATED SCIENTIFIC STUDIES OF THERMAL PLASMA DISTRIBUTION, ENERGETIC PARTICLES (EXCLUDING GALACTIC COSMIC RAYS), FIELDS, AND WAVES. THE SPACECRAFT WILL BE PUT INTO A GEOSTATIONARY EQUATORIAL ORBIT AND WILL BE SPIN STABILIZED WITH ITS SPIN AXIS ORIENTED PERPENDICULAR TO THE ORBITAL PLANE. THE SPACECRAFT WILL BE ATTITUDE STABILIZED USING THREE-AXIS THRUSTERS WITH A HYDRAZINE PROPULSION SYSTEM. A LONGITUDINAL 51PT MANEUVERING BETWEEN IS DEG W AND 50 DEG E IS ANTICIPATED. THE PLANNED SPIN RATE OF THE SPACECRAFT WILL BE BETWEEN 10 AND 60 RPM. NORMALLY, THE SPACECRAFT WILL BE LOCATED SOMEWHERE BETWEEN THE PLASMA SHEET AND THE INNER EDGE OF THE PLASMA SHEET. IT IS EXPECTED, HOWEVER, THAT UNDER EXTREMELY QUIET CONDITIONS THE PLASMA SHEET WILL EXTEND BEYOND 6.6 RE. THERE WILL BE NO ONBOARD TAPE RECORDER, AND SOME EXPERIMENTS WILL REQUIRE ONLINE COMPUTER CONTROL.

----- ESRO GEOS, JORDO -----

EXPERIMENT NAME- THERMAL PLASMA FLOW

NSSDC ID- ESRO -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.L.F. BOYDU COLLEGE LONDON
LONDON, ENGLAND
OI - K. NORMANU COLLEGE LONDON
LONDON, ENGLAND
OI - W.J. RAITTU COLLEGE LONDON
LONDON, ENGLAND
OI - G.L. WRENNU COLLEGE LONDON
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

TWO ELECTROSTATIC ANALYZERS WILL BE USED TO STUDY THE THERMAL PLASMA AMBIENT IN THE REGION OF A GEOSTATIONARY ORBIT. MOUNTED ON AT LEAST A TWO-M ODOM, THE SENSORS WILL BE ORIENTED SO THAT ONE DETECTOR LOOKS PARALLEL TO THE SPACECRAFT SPIN AXIS AND ONE DETECTOR LOOKS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS.

----- ESRO GEOS. GEISS -----

EXPERIMENT NAME- LOW-ENERGY ION COMPOSITION

NSSDC ID- ES4FO -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J. GEISSU OF BERNE
BERNE, SWITZERLAND
OI - P.X. EDERHAUTU OF BERNE
BERNE, SWITZERLAND
OI - H.R. DISCHHAUERMPI-EXTRATERRE PHYS
GARCHING, FED REP OF GERMANY
OI - H. DALSIGERU OF BERNE
BERNE, SWITZERLAND
OI - P. HIRTU OF BERNE
BERNE, SWITZERLAND
OI - A. GHIEMETTIU OF BERNE
BERNE, SWITZERLAND
OI - H. LOIDLU OF BERNE
BERNE, SWITZERLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY ION COMPOSITION, ENERGY SPECTRA, AND THE ANGULAR DISTRIBUTION OF LOW-ENERGY PARTICLES USING AN ELECTROSTATIC ANALYZER FOLLOWED BY A COMBINED ELECTROSTATIC MAGNETIC ANALYZER. THE DETECTOR WILL BE LOCATED ON THE SATELLITE BODY, POINTED PERPENDICULAR TO THE SPIN AXIS, I.E., IN THE SPACECRAFT ORBITAL PLANE.

----- ESRO GEOS. GENDRIN -----

EXPERIMENT NAME- ELECTROMAGNETIC WAVE FIELDS

NSSDC ID- ES6FO -06

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H. GENDRINCNET
PARIS, FRANCE
OI - J.N. ETCHEVOCNET
PARIS, FRANCE
OI - E. UNGSTROMDANISH SPACE RES INST
LYNGBY, DENMARK

EXPERIMENT BRIEF DESCRIPTION

ORTHOGONAL SHORT ELECTRIC DIPOLE AND MAGNETIC METAL CORE SEARCH COIL SYSTEMS, DESIGNED TO OBTAIN ELECTROSTATIC PLASMA WAVE MEASUREMENTS, WILL BE LOCATED ON THE TIPS OF FOUR ODOMS MOUNTED PARALLEL TO THE SATELLITE SPIN AXIS. THE ELECTRIC ANTENNA SYSTEM WILL OPERATE BETWEEN 10 HZ AND 10 KHZ. AND THE MAGNETIC SYSTEM WILL OPERATE BETWEEN 0.1 HZ AND 3.5 KHZ.

----- ESRO GEOS. HULTQUIST -----

EXPERIMENT NAME- LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION

NSSDC ID- ES6FO -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - B.K.G. HULTQUISTKIRUNA GEOPHYS INST
KIRUNA, SWEDEN
OI - H. NORRKIRUNA GEOPHYS INST
KIRUNA, SWEDEN
OI - L.A. HOLMGRENKIRUNA GEOPHYS INST
KIRUNA, SWEDEN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE PITCH ANGLE DISTRIBUTION OF ELECTRONS AND PROTONS IN THE 0.2- TO 20-KEV ENERGY RANGE USING 10 ELECTROSTATIC ANALYZERS. THE DETECTORS WILL BE LOCATED ON THE SPACECRAFT BODY AND WILL HAVE VIEWING ANGLES BETWEEN 0 AND 100 DEG RELATIVE TO THE SPIN AXIS. EMPHASIS WILL BE PUT ON ANGULAR RESOLUTION.

----- ESRO GEOS. MARIANI -----

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETER

NSSDC ID- ES6EO -09

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F. MARIANIU OF AQUILA
AQUILA, ITALY
OI - M. CANDIDINATL RES COUNCIL
ROME, ITALY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL STUDY DC AND VLF MAGNETIC FIELDS USING A TRIAXIAL FLUXGATE MAGNETOMETER LOCATED AT THE END OF A 2-M ODOM.

----- ESRO GEOS. MELZNER -----

EXPERIMENT NAME- DC ELECTRIC FIELD AND GRADIENT & ELECTRON BEAM DEFLECTION

NSSDC ID- ES6EO -08

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F. MELZNERMPI-EXTRATERRE PHYS
GARCHING, FED REP OF GERMANY
OI - H. VOLKMPI
GARCHING, FED REP OF GERMANY
OI - G. METZNERMPI-EXTRATERRE PHYS
GARCHING, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION

ELECTRON BEAMS EMITTED FROM ODOM-MOUNTED GUNS WILL BE DETECTED FROM THE MAIN SATELLITE TO DETERMINE, BY BEAM DEFLECTION, THE DC ELECTRIC FIELD AND GRADIENTS IN THE DC MAGNETIC FIELDS.

----- ESRO GEOS. PETERSEN -----

EXPERIMENT NAME- DC FIELDS

NSSDC ID- ES6EO -07

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A. PETERSENESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - D. JONESESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - K. KNOTTESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - R.J.L. GRARDESRO-ESTEC
NOORDWIJK, NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL OBSERVE DC ULF AND VLF FIELDS BY MEANS OF A RECEIVER/ANTENNA SYSTEM. THE ANTENNA WILL CONSIST OF A PAIR OF SPHERES MOUNTED ON THE ENDS OF A 20-M ODOM THAT WILL EXTEND IN OPPOSITE DIRECTIONS FROM THE SPACECRAFT. THE ANTENNA WILL BE PERPENDICULAR TO THE SPIN AXIS OF THE SPACECRAFT.

----- ESRO GEOS. PETIT -----

EXPERIMENT NAME- VLF FIELD ANTENNA

NSSDC ID- ES6EO -05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H. PETITCNET
PARIS, FRANCE
OI - C. DEGHINIONOSPHERIC RES GROUP
ORLEANS, FRANCE

EXPERIMENT BRIEF DESCRIPTION

A 20-M BALANCED DIPOLE NORMAL TO THE SPACECRAFT SPIN AXIS WILL BE USED TO DETECT VLF PLASMA RESONANCES EXCITED BY SIGNALS EMITTED FROM THE SAME ANTENNA. THE INSTRUMENT IS DESIGNED TO CAPACITIVELY COUPLE TO THE THERMAL PLASMA.

----- ESRO GEOS. PFOTZER -----

EXPERIMENT NAME- ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION

NSSDC ID- ES6EO -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G. PFOTZERMPI-AERONOMY
DI - E. KEPPLERMPI-AERONOMY
OI - G. WILKENMPI-AERONOMY
DI - A. KORTHMPI-AERONOMY
OI - J. MUENCHMPI-AERONOMY

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL STUDY THE ENERGY-DEPENDENT RITCH
ANGLE DISTRIBUTION FOR ELECTRONS FROM 30 TO 200 KEV AND FOR
PROTON FLUXES FROM 40 KEV TO 1.4 MEV IN TWO DIRECTIONS. THE
EXPERIMENT WILL USE A MAGNETIC DEFLECTION SYSTEM AND TWO
PARTICLE TELESCOPES. THE VIEWING ANGLE OF THE SYSTEM WILL BE 0
TO 120 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS.

***** ESSA 8 *****

SPACECRAFT COMMON NAME- ESSA 8
ALTERNATE NAMES- PL-591A, TOS-F
03615
NSSDC ID- 68-114A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/15/68.

LAUNCH DATE- 12/15/68 SPACECRAFT WEIGHT- 297. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES FSSA

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 12/16/68
ORBIT PERIOD- 114.7 MIN INCLINATION- 101.90 DEG
PERIAPSIS- 1410.00 KM ALT APOAPSIS- 1473.00 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 09/07/73
ORBIT PERIOD- 114.60 MIN INCLINATION- 101.642 DEG
PERIAPSIS- 1411.88 KM ALT APOAPSIS- 1462.50 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - W.W. JONESNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ESSA 8 WAS A SUN-SYNCHRONOUS OPERATIONAL METEOROLOGICAL
SATELLITE DESIGNED TO PROVIDE REAL-TIME EARTH CLOUDCOVER TV
PICTURES TO PROPERLY EQUIP GROUND RECEIVING STATIONS FOR USE
IN WEATHER ANALYSIS AND FORECASTING. THE SATELLITE HAD
ESSENTIALLY THE SAME CONFIGURATION AS THAT OF A TIROS
SPACECRAFT, I.E., AN 18-SIDED RIGHT PRISM, 107 CM ACROSS
OPPOSITE CORNERS AND 56 CM HIGH, WITH A REINFORCED BASEPLATE
CARRYING MOST OF THE SUBSYSTEMS AND A COVER ASSEMBLY (HAT).
ELECTRICAL POWER WAS PROVIDED BY APPROXIMATELY 10,000 1- W
2-CM SOLAR CELLS THAT WERE MOUNTED ON THE COVER ASSEMBLY AND
BY 21 NICKEL-CADMIUM BATTERIES. TWO REDUNDANT WIDE-ANGLE
AUTOMATIC PICTURE TRANSMISSION (APT) CAMERAS WERE MOUNTED ON
OPPOSITE SIDES OF THE SPACECRAFT WITH THEIR OPTICAL AXES
PERPENDICULAR TO THE SPIN AXIS, PROJECTING DOWNWARD FROM THE
BASEPLATE WERE A PAIR OF CROSSED-DIPOLE COMMAND RECEPTION
ANTENNAS. A MONOPOLE TELEMETRY (136.500 MHZ) AND TRACKING
(136.770 MHZ) ANTENNA EXTENDED OUTWARD FROM THE TOP OF THE
COVER ASSEMBLY. THE SATELLITE SPIN RATE WAS CONTROLLED BY
MEANS OF A MAGNETIC ATTITUDE SPIN COIL (MASC), WITH THE SPIN
AXIS MAINTAINED NORMAL TO THE ORBITAL PLANE (CARTWHEEL ORBIT
MODE) TO WITHIN PLUS OR MINUS 1 DEG. THE MASC WAS A
CURRENT-CARRYING COIL MOUNTED IN THE COVER ASSEMBLY. THE
MAGNETIC FIELD INDUCED BY THE CURRENT INTERACTED WITH THE
EARTH'S MAGNETIC FIELD TO PROVIDE THE TORQUE NECESSARY TO
MAINTAIN A DESIRED SPIN RATE OF 10.9 RPM.

----- ESSA 8, NESS STAFF -----

EXPERIMENT NAME- AUTOMATIC PICTURE TRANSMISSION (APT)
SYSTEM

NSSDC ID- 68-114A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 03/00/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFFNDA-NESS
SUITLAND, MD.

EXPERIMENT BRIEF DESCRIPTION
THE ESSA 8 AUTOMATIC PICTURE TRANSMISSION (APT)
SUBSYSTEM WAS A CAMERA AND TRANSMITTER COMBINATION DESIGNED TO
TRANSMIT REAL-TIME, DAYLIGHT, SLOW-SCAN TELEVISION PICTURES OF
CLOUDCOVER TO ANY PROPERLY EQUIPPED GROUND RECEIVING STATIONS.
THE CAMERA SYSTEM CONSISTED OF TWO REDUNDANT APT CAMERAS WITH
2.54-CM-DIAM VIDICONS. EACH CAMERA HAD A 100-DEG WIDE-ANGLE
F/1.8 OBJECTIVE LENS WITH A FOCAL LENGTH OF 5.7 MM. THE
CAMERAS WERE MOUNTED 180 DEG APART ON THE SIDE OF THE
SPACECRAFT, WITH THEIR OPTICAL AXES PERPENDICULAR TO THE
SPACECRAFT SPIN AXIS. THE CAMERAS WERE PROGRAMMED TO TAKE FOUR
OR EIGHT APT PICTURES PER ORBIT. THE ACTUAL PICTURE TAKING
REQUIRED 8 SEC AND THE TRANSMISSION 200 SEC. EARTH-CLOUD

IMAGES WERE RETAINED ON THE PHOTOSENSITIVE SURFACE OF THE
VIDICON AND WERE READ OUT AT FOUR LINES PER SECOND TO PRODUCE
AN 800-LINE PICTURE. TWO 5-W TV TRANSMITTERS (1137.5 MHZ)
RELAYED THE PICTURES TO LOCAL APT STATIONS WITHIN
COMMUNICATION RANGE. THE FACEPLATE OF THE VIDICON HAD REFLECTE
MARKS THAT APPEARED ON THE PICTURE FORMAT TO AID IN RELATING
THE PICTURE TO ITS GEOGRAPHICAL POSITION ON THE EARTH'S
SURFACE. AT NOMINAL SATELLITE ATTITUDE AND ALTITUDE
(APPROXIMATELY 1450 KM), A PICTURE COVERED A 3100- BY 3100-KM
SQUARE WITH A HORIZONTAL RESOLUTION OF ABOUT 4 KM AT NADIR.
THERE WAS A 30 PERCENT OVERLAP BETWEEN PICTURES ALONG THE
TRACK TO ENSURE COMPLETE COVERAGE. A SHIFT IN CAMERA NUMBER 2
VIDICON SCANNING OCCURRED IN THE SPRING OF 1969, AND ITS
OPERATION HAS BEEN LIMITED SINCE THAT TIME. IDENTICAL
EXPERIMENTS WERE FLOWN ON ESSA 2, 4, AND 6. APT DATA ARE
PRIMARYLY INTENDED FOR OPERATIONAL USE WITHIN THE LOCAL APT
ACQUISITION STATION. HOWEVER, COPIES OF PICTURES TAKEN OVER
THE UNITED STATES ARE MAINTAINED ON FILE AT NOAA-NESS,
SUITLAND, MARYLAND.

***** EXOS-A *****

SPACECRAFT COMMON NAME- EXOS-A
ALTERNATE NAMES- EXOSPHERIC SAT. A
NSSDC ID- EXOS-A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 00/00/77 SPACECRAFT WEIGHT- 75. KG
LAUNCH SITE- KAGOSHIMA, JAPAN
LAUNCH VEHICLE- N-35-H

SPONSORING COUNTRY/AGENCY
JAPAN TOKYO U

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN INCLINATION- 60. DEG
PERIAPSIS- 250.000 KM ALT APOAPSIS- 3900.00 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - K. HIRAOJ OF TOKYO
TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION
THIS SATELLITE WILL BE PART OF JAPAN'S CONTRIBUTION TO
THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE OBJECTIVE WILL BE
TO STUDY THE POLAR AURORA AND IONOSPHERE. THE PAYLOAD WILL
CONSIST OF AN AURORAL UV TELEVISION CAMERA AND MASS
SPECTROMETER DESIGNED TO STUDY THE ELECTRON AND ION DENSITY
AND TEMPERATURE. THERE WILL ALSO BE ENERGETIC PARTICLE
DETECTORS DESIGNED TO STUDY THE FLUX OF ELECTRONS IN THE
IONOSPHERE.

----- EXOS-A, UNKNOWN -----

EXPERIMENT NAME- IONOSPHERIC PROBES

NSSDC ID- EXOS-A -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION
IONOSPHERIC PROBES WILL OBSERVE ELECTRON DENSITY AND
TEMPERATURE IN ADDITION TO ION DENSITY, COMPOSITION AND
TEMPERATURE.

----- EXOS-A, UNKNOWN -----

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS

NSSDC ID- EXOS-A -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE THE FLUX OF
ELECTRONS AND PROTONS IN THE MAGNETOSPHERE, USING ENERGETIC
PARTICLE DETECTORS, ESPECIALLY IN THE POLAR REGIONS.

----- EXOS-A, UNKNOWN -----

EXPERIMENT NAME- X-RAY AND ULTRAVIOLET AURORAL TELESCOPES

NSSDC ID- EXOS-A -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION

EXOS-A IS A JAPANESE SCIENTIFIC SATELLITE THAT WILL BE LAUNCHED DURING THE INTERNATIONAL MAGNETOSPHERIC STUDY, 1976-1978. THIS EXPERIMENT WILL CONTRIBUTE TO ONE OF THE SATELLITE'S OBJECTIVES OF EXPLORING THE POLAR IONOSPHERE, BY MEASURING AURORAL EMISSIONS WITH X-RAY AND ULTRAVIOLET AURORAL TELESCOPES.

----- EXOS-A, UNKNOWN -----

EXPERIMENT NAME- MAGNETOMETER

NSSDC ID- EXOS-A -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE THE EARTH'S MAGNETIC FIELD, ESPECIALLY OVER THE POLAR REGIONS, USING MAGNETOMETERS.

***** EXOS-B *****

SPACECRAFT COMMON NAME- EXOS-B
ALTERNATE NAMES- EXOSPHERIC SAT. B
NSSDC ID- EXOS-B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 00/00/78 SPACECRAFT WEIGHT- 60. KG
LAUNCH SITE- KAGOSHIMA, JAPAN
LAUNCH VEHICLE- M-35-B

SPONSORING COUNTRY/AGENCY
JAPAN TOKYO U

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC INCLINATION- 30. DEG
ORBIT PERIOD- 400. MIN APOAPSIS- 30000. KM ALT
PERIAPSIS- 500. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - T. OHAYASHI *****U OF TOKYO
TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION
THIS SATELLITE WILL BE PART OF JAPAN'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE SATELLITE WILL STUDY THE PLASMA WIND UP TO GEOCENTRIC DISTANCES OF 30,000 KM. ITS PLASMA EXPERIMENTS WILL STUDY THE ELECTRON AND ION DENSITY AND TEMPERATURE. THE SPACECRAFT WILL CARRY ENERGETIC PARTICLE DETECTORS TO STUDY THE ELECTRON AND PROTON FLUX IN THE ENERGY RANGE 10 TO 10,000 EV, AND ELECTROMAGNETIC FIELD FLUCTUATION DETECTORS.

----- EXOS-B, UNKNOWN -----

EXPERIMENT NAME- MAGNETOSPHERIC PLASMA PROBE

NSSDC ID- EXOS-B -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL USE PLASMA PROBES TO MEASURE THE MAGNETOSPHERIC ELECTRON (AND ION) DENSITY AND TEMPERATURE IN THE ENERGY RANGE 0 TO 1 KEV PER UNIT CHARGE, UP TO AN ALTITUDE OF 30,000 KM.

----- EXOS-H, UNKNOWN -----

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS

NSSDC ID- EXOS-H -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE ELECTRON AND PROTON FLUXES IN THE MAGNETOSPHERE IN THE ENERGY RANGE 10 EV TO 10 KEV, ESPECIALLY IN THE PLASMASPHERE REGION.

----- EXOS-D, UNKNOWN -----

EXPERIMENT NAME- ELECTROMAGNETIC FIELD FLUCTUATION DETECTORS

NSSDC ID- EXOS-D -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE ELECTROMAGNETIC FIELD FLUCTUATIONS THROUGHOUT THE PLASMASPHERE.

***** EXOS-C *****

SPACECRAFT COMMON NAME- EXOS-C
ALTERNATE NAMES- EXOSPHERIC SAT. C
NSSDC ID- EXOS-C

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 01/00/78 SPACECRAFT WEIGHT- 100. KG
LAUNCH SITE- KAGOSHIMA, JAPAN
LAUNCH VEHICLE- M-45-H

SPONSORING COUNTRY/AGENCY
JAPAN TOKYO U

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC INCLINATION- 50. DEG
ORBIT PERIOD- MIN APOAPSIS- 500. KM ALT
PERIAPSIS- 500. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - M. ODA *****U OF TOKYO
TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION
THE PURPOSE OF THIS SPACECRAFT WILL BE TO MONITOR CHARGED PARTICLES AND X-RAY, GAMMA-RAY, UV, AND IR RADIATION FROM THE SUN AND GALAXIES. THE SPACECRAFT WILL BE PUT INTO A CIRCULAR ORBIT OF 500-KM ALTITUDE AND WILL BE CAPABLE OF PRECISE ATTITUDE CONTROL. FIVE DETECTOR SYSTEMS WILL BE USED TO ATTAIN THE GOALS OF THIS MISSION -- X-RAY TELESCOPES, A GAMMA-RAY TELESCOPE, A UV TELESCOPE, AN IR TELESCOPE, AND ENERGETIC PARTICLE DETECTORS.

----- EXOS-C, UNKNOWN -----

EXPERIMENT NAME- X-RAY AND GAMMA-RAY ASTRONOMICAL TELESCOPES

NSSDC ID- EXOS-C -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL OBSERVE ASTRONOMICAL SOURCES WITH X-RAY AND GAMMA-RAY TELESCOPES.

----- EXOS-C, UNKNOWN -----

EXPERIMENT NAME- ULTRAVIOLET TELESCOPE

NSSDC ID- EXOS-C -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL BE USED TO OBSERVE ASTRONOMICAL OBJECTS IN THE UV REGION OF THE SPECTRUM.

----- EXOS-C, UNKNOWN -----

EXPERIMENT NAME- INFRARED TELESCOPE

NSSDC ID- EXOS-C -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL BE USED TO OBSERVE ASTRONOMICAL OBJECTS IN THE INFRARED REGION OF THE SPECTRUM.

----- EXOS-C, UNKNOWN -----

EXPERIMENT NAME- ENERGETIC PARTICLES

NSSDC ID- EXOS-C -04

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN*****

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT IS TO MEASURE ENERGETIC
CHARGED PARTICLES OF BOTH SOLAR AND GALACTIC ORIGIN.

***** GEOS-C *****

SPACECRAFT COMMON NAME- GEOS-C
ALTERNATE NAMES- GEODETIC SATELLITE-C
NSSDC ID- GEOS-C

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 03/00/75 SPACECRAFT WEIGHT- 241.0 KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DA
UNITED STATES NOAA-NESS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC INCLINATION- 115 DEG
ORBIT PERIOD- 103.5 MIN APDAPSIS- 964 KM ALT
PERIAPSIS- 890 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.S. DILLER *****NASA HEADQUARTERS
WASHINGTON, DC
PS - J.P. MURPHY *****NASA HEADQUARTERS
WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION
THE SPACECRAFT WILL CONSIST OF AN OCTAHEDRON, TOPPED BY
A TRUNCATE PYRAMID, WITH A PARABOLIC REFLECTOR FOR A RADAR
ALTIMETER ON THE FLAT BOTTOM SIDE. A METAL RIGID BODY WITH
END MASS WILL EXTEND UPWARD APPROXIMATELY 20 FT FROM THE TOP
OF THE PYRAMID. PASSIVE LASER RETROREFLECTOR CUBES WILL BE
MOUNTED IN A RING AROUND THE PARABOLIC REFLECTOR WITH THE
NORMAL VECTOR FROM EACH CUBE FACING 45 DEG OUTWARD FROM THE
EARTH DIRECTION OF THE BODY AXIS. A TURNSTILE ANTENNA FOR VHF
AND UHF FREQUENCIES AND SEPARATE ANTENNAS FOR EARTH-VIEWING
324-MHZ DOPPLER, C-BAND, AND S-BAND TRANSPONDERS WILL BE
MOUNTED SEPARATELY ON FLAT SURFACES NEXT TO THE PARABOLIC
REFLECTOR. THE DIMENSION ACROSS THE FLATS OF THE OCTAHEDRON
WILL BE 40 IN., AND THE SPACECRAFT WILL BE 43.74 IN. HIGH WITH
A TOTAL WEIGHT OF 530 LBS. THE MISSION WILL PROVIDE THE
STEPPING STONE BETWEEN THE ONGOING NATIONAL GEODETIC SATELLITE
PROGRAM (NGSP) AND THE EMERGING EARTH AND OCEAN PHYSICS
APPLICATION PROGRAM. IT WILL PROVIDE DATA TO REFINES THE
GEODETIC AND GEOPHYSICAL RESULTS OF THE NGSP AND WILL SERVE AS
A TEST FOR NEW SYSTEMS. MISSION OBJECTIVES WILL BE TO PERFORM
A SATELLITE ALTIMETRY EXPERIMENT IN ORBIT, TO SUPPORT FURTHER
THE CALIBRATION AND POSITION DETERMINATION OF NASA AND OTHER
AGENCY C-BAND RADAR SYSTEMS, AND TO PERFORM A
SATELLITE-TO-SATELLITE TRACKING EXPERIMENT WITH THE AIS-F
SPACECRAFT USING AN S-BAND TRANSPONDER SYSTEM. THIS SYSTEM
WILL ALSO BE USED FOR PERIODIC GEOS-C TELEMETRY DATA RELAY
THROUGH AIS-F, TO SUPPORT FURTHER THE INTERCOMPARISON OF
TRACKING SYSTEMS, TO INVESTIGATE THE SOLID-EARTH DYNAMIC
PHENOMENA THROUGH PRECISION LASER TRACKING, TO REFINES FURTHER
ORBIT DETERMINATION TECHNIQUES AS WELL AS THE DETERMINATION OF
INTERMEDIATE TIES AND GRAVITY MODELS, AND TO SUPPORT THE
CALIBRATION AND POSITION DETERMINATION OF NASA-STON S-BAND
TRACKING STATIONS.

***** GEOS-C, JACKSON *****

EXPERIMENT NAME- C-BAND SYSTEM

NSSDC ID- GEOS-C -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - E.B. JACKSON *****NASA-WFO
WALLOPS ISLAND, VA

EXPERIMENT BRIEF DESCRIPTION
THE C-BAND TRANSPONDER SUBSYSTEM WILL CONSIST OF TWO
TRANSPONDERS, ONE THE GEOS-2 NON-COHERENT TYPE AND THE OTHER A
COHERENT C-BAND TRANSPONDER. THE NON-COHERENT TRANSPONDER
WILL PROVIDE FOR RANGE AND ANGLE MEASUREMENTS, WHILE THE
COHERENT TRANSPONDER WILL PROVIDE FOR BOTH RANGE, RANGE-RATE,
AND ANGLE MEASUREMENTS. BOTH TRANSPONDERS WILL RECEIVE
SIGNALS AT 5690 MHZ, BUT THE COHERENT TRANSPONDER WILL
TRANSMIT AT 5690 MHZ, WHILE THE NON-COHERENT TYPE WILL
TRANSMIT AT 5745 MHZ. EACH C-BAND TRANSPONDER WILL TRANSMIT
ONE PULSE FOR EACH CODED GROUP OF PULSES TRANSMITTED BY A
GROUND TRACKING C-BAND RADAR. THE INTERNAL DELAY BETWEEN THE
RECEIVED GROUND TRANSMITTED PULSE CODE AND THE TRANSPONDER
TRANSMITTED PULSE WILL BE CAREFULLY CALIBRATED PRIOR TO
LAUNCH. EACH TRANSPONDER (WHILE OPERATING SEPARATELY OR
SIMULTANEOUSLY) WILL BE CAPABLE OF OPERATING IN EITHER OF TWO
MODES, STANDBY OR OVERRIDE. IN STANDBY, THE RECEIVER WILL
BECOME OPERATIONAL AFTER APPROXIMATELY 60 SEC OF INTERROGATION
OR LONG ENOUGH FOR THE OUTPUT TUBE TO WARM UP, WHILE IN THE
OVERRIDE MODE OF OPERATION THE OUTPUT TUBE FILAMENT WILL BE

ENERGIZED BY THE EXTERNAL COMMAND AND THE WARM-UP DELAY
CIRCUIT BYPASSED AFTER THE TUBE WARMS UP, THUS ALLOWING THE
TRANSPONDER TO RESPOND IMMEDIATELY TO INTERROGATION SIGNALS.
THIS OVERRIDE MODE WILL BE INCORPORATED TO EASE GROUND COMMAND
REQUIREMENTS AND TO CONSERVE SPACECRAFT POWER.

***** GEOS-C, MINOTT *****

EXPERIMENT NAME- LASER CUBE SYSTEM

NSSDC ID- GEOS-C -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - P. MINOTT *****NASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
LASER CORNER REFLECTORS, COMPOSED OF 270 (MINIMUM) 35-4MM
CUBES, WILL BE UTILIZED IN CONJUNCTION WITH GROUND-BASED LASER
SYSTEMS TO OBTAIN PRECISE SATELLITE TRACKING INFORMATION. THE
APPLIED PHYSICS LABORATORY WILL BE RESPONSIBLE FOR PROVIDING
THE NECESSARY LASER CUBE REFLECTOR PANELS. THE CUBES WILL BE
CONFIGURED ON THE LATERAL SURFACE OF A CONIC FRUSTUM, WITH THE
LATERAL SURFACE OF THE FRUSTUM ADJOINING THE BOTTOM,
EARTH-ORIENTED SURFACE OF THE SPACECRAFT AT A 45-DEG ANGLE.
THE BASE OF THE FRUSTUM WILL MEASURE APPROXIMATELY 3.0 METERS
IN DIAM. WHEN ILLUMINATED BY A LASER LIGHT PULSE FROM THE
GROUND, EACH RETROREFLECTOR CUBE IN THE ARRAY WILL REFLECT THE
LIGHT RAY BACK TO A SPECIAL TELESCOPE RECEIVED ON THE GROUND.
THE REFLECTED LIGHT WILL BE PICKED UP BY THE TELESCOPE AND THE
OPTICAL IMPULSES CONVERTED TO AN ELECTRICAL SIGNAL. A DIGITAL
COUNTER WILL RECORD THE TIME AT WHICH THE BEAM OF LIGHT IS
RETURNED TO THE GROUND. THE TOTAL TRAVEL TIME OF THE LIGHT
PULSES, FROM GROUND TO SATELLITE AND BACK TO THE GROUND, WILL
MEASURE THE DISTANCE TO THE SATELLITE AND THUS FORM THE BASIS
OF THE SATELLITE OPTICAL LASER SYSTEM. THE FOLLOWING
OBSERVATIONAL SYSTEMS WILL BE UTILIZED IN ACQUIRING THE
NECESSARY DATA -- NASA/WALLOPS LASER RANGING SYSTEMS, RAD
LASER RANGING SYSTEMS, GSFC LASER RANGING SYSTEMS, AND OTHER
NATIONAL AND INTERNATIONAL LASER STATIONS AS DETERMINED.

***** GEOS-C, STANLEY *****

EXPERIMENT NAME- RADAR ALTIMETER SYSTEM

NSSDC ID- GEOS-C -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - H.P. STANLEY *****NASA-WFO
WALLOPS ISLAND, VA

EXPERIMENT BRIEF DESCRIPTION
THE RADAR ALTIMETER EXPERIMENT WILL BE THE HIGHEST
PRIORITY EXPERIMENT ABOARD GEOS-C. ITS PURPOSES WILL BE TO
DETERMINE THE FEASIBILITY AND UTILITY OF A SPACE-BORNE RADAR
ALTIMETER TO MAP THE TOPOGRAPHY OF THE OCEAN SURFACE WITH AN
ABSOLUTE ACCURACY WITHIN 5 METERS, AND WITH A RELATIVE
ACCURACY OF 1 TO 2 METERS, TO DETERMINE THE FEASIBILITY OF
MEASURING THE DEFLECTION OF THE VERTICAL AT SEA, TO DETERMINE
THE FEASIBILITY OF MEASURING WAVE HEIGHT, AND TO CONTRIBUTE TO
THE TECHNOLOGY LEADING TO A FUTURE OPERATIONAL
ALTIMETER-SATELLITE SYSTEM WITH A 10-CM MEASUREMENT
CAPABILITY. TO MEET THE OBJECTIVES OF THE EXPERIMENT, THE
ALTIMETER WILL HAVE TWO DISTINCT DATA GATHERING MODES - A
LONG-PULSE ALTIMETRY DATA MODE AND A SHORT-PULSE MODE. IT IS
INTENDED THAT THE PERFORMANCE CAPABILITIES AND OPERATING
CHARACTERISTICS OF THE ALTIMETER MAY DIFFER FOR THE TWO MODES.
BOTH MODES WILL OPERATE ON A 13.9-GHZ FREQUENCY. BOTH WILL
USE A PARABOLIC ANTENNA. BOTH WILL HAVE A MAXIMUM RANGE
ACQUISITION TIME OF 6 SEC. BOTH WILL HAVE AN ALTITUDE
GRANULARITY OF PLUS OR MINUS 0.2 METERS. DIFFERING
CHARACTERISTICS WILL BE -- (1) ALTITUDE DATA RATE FOR LONG
PULSE WILL BE 2 READINGS/SEC AND FOR SHORT PULSE 6 READINGS/SEC,
AND (2) INPUT POWER FOR LONG PULSE WILL BE 50 W, FOR SHORT
PULSE 100 W. THE GEOS-C RADAR ALTIMETER WILL HAVE SEVERAL
FEATURES IN COMMON WITH THE ALTIMETER USED ON THE SKYLAB
SATELLITE, BUT WILL HAVE ADVANTAGES OVER THE SKYLAB ALTIMETER
BECAUSE OF ITS IMPROVED ACCURACY AND ABILITY TO OPERATE OVER
EXTENDED AREAS FOR GREATER PERIODS OF TIME, THEREBY PROVIDING
THE CAPABILITY TO EXAMINE THE EARTH OVER LONGER ARCS AND
OBSERVE EXTENSIVE OCEAN AREAS.

***** GEOS-C, STECKEL *****

EXPERIMENT NAME- S-BAND TRANSPONDER SYSTEM

NSSDC ID- GEOS-C -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.H. STECKEL *****NASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE S-BAND TRANSPONDER SUBSYSTEM WILL BE USED TO PROVIDE
METRIC TRACKING DATA (RANGE, RANGE-RATE). IT WILL NOT HAVE

THE CAPABILITY OF RECEIVING COMMANDS, BUT IT WILL HAVE THE CAPABILITY OF TRANSMITTING TELEMETRY DATA. THE TRANSPONDER WILL BE UTILIZED IN THE FOLLOWING THREE PRIMARY MODES -- (1) SATELLITE-TO-SATELLITE TRACKING (SST) FROM THE ROSSMAN OR EUROPEAN ATS GROUND STATIONS THROUGH ATS-F TO GEOS-C AND BACK, (2) DIRECT USSR (DOPPLER ONLY) GROUND STATION TRACKING OF GEOS-C, AFTER THE USSR GROUND STATIONS ARE MODIFIED, AND (3) DIRECT GRARR GROUND STATION TRACKING OF GEOS-C. THE TRANSPONDER SUBSYSTEM WILL CONSIST OF A SINGLE-CHANNEL TRANSPONDER, A POWER AMPLIFIER, A DUPLEXER, AND AN EARTH-VIEWING AND ATS-VIEWING ANTENNA SYSTEM. THE ANTENNAS WILL BE SELECTABLE BY GROUND COMMAND. THE EARTH-VIEWING ANTENNA FOR DIRECT TRACKING WITH THE USSR AND GRARR GROUND STATIONS WILL HAVE APPROXIMATELY HEMISPHERICAL COVERAGE AND A MINIMUM OF 0-DB GAIN WITHIN 60 DEG OF THE SPACECRAFT Z-AXIS. THE ANTENNA SYSTEM FOR SST WILL CONSIST OF AN IN-TRACK ARRAY WHICH WILL PROVIDE A 3-DB GAIN IN THE DIRECTION OF ATS FOR GEOS ASCENDING AND DESCENDING NODE PASSES, WHICH WILL CROSS THE EQUATOR WITHIN PLUS OR MINUS 26 DEGREES OF THE ATS SUB-SATELLITE POINT. IN THE SST MODE OF OPERATION, THE INTERROGATION SIGNAL WILL FIRST BE TRANSMITTED AT C-BAND BY THE ATS GROUND STATION TO THE ATS-F SPACECRAFT. ATS SPACECRAFT INSTRUMENTATION WILL COHERENTLY ALTER THE SIGNAL, MAKING IT COMPATIBLE WITH THE INPUT FREQUENCY (2069.1125 MHZ) OF THE S-BAND TRANSPONDER ON GEOS-C, AND TRANSMIT THE SIGNAL TO GEOS-C. GEOS-C THEN, AFTER TRANSLATING THE RECEIVED SIGNAL, WILL RETRANSMIT IT TO ATS-F AS IF ATS-F WERE ANOTHER GROUND STATION. ATS-F WILL THEN RETRANSMIT THE SIGNAL TO THE ATS GROUND STATION AT C-BAND. RANGE SUM AND RANGE-RATE SUM WILL BE OBTAINED BY COMPARING THE INTERROGATION AND RESPONSE SIGNALS. THE S-BAND SYSTEM ON GEOS-C WILL ALSO BE TRACKED BY THE USSR AND GRARR GROUND STATIONS. CARRIER FREQUENCIES (2069.1125 MHZ UP, AND 2247 MHZ DOWN) WILL BE IDENTICAL TO THOSE OF THE SST MODE. COHERENT GRARR TRACKING WILL BE ACCOMPLISHED VIA STANDARD GRARR RANGING SIDE TONES. USSR TRACKING WILL CONSIST ONLY OF COHERENT-CARRIER DOPPLER TRACKING. THE S-BAND TRANSPONDER WILL BE A SINGLE-CHANNEL TRANSPONDER, AND THEREFORE SIMULTANEOUS OPERATION WILL NOT BE POSSIBLE.

----- GEOS-C, UNKNOWN -----

EXPERIMENT NAME- US NAVY DOPPLER SYSTEM

NSSDC ID- GEOS-C -05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THE DOPPLER TECHNIQUE OF TIMING AND MEASURING THE FREQUENCY SHIFT OF RADIO TRANSMISSIONS FROM A MOVING SPACECRAFT WILL BE USED TO OBTAIN DATA WHICH WILL FURTHER ESTABLISH THE STRUCTURE OF THE EARTH'S GRAVITATIONAL FIELD THROUGH THE COMPARISON OF NEW WITH ESTABLISHED GEODETIC MEASUREMENTS. TWO TRANSMITTERS WILL BE OPERATED AT FREQUENCIES OF 162 AND 324 MHZ. THE DUAL FREQUENCIES WILL BE COHERENTLY RELATED AND UTILIZED IN CONJUNCTION WITH GROUND DOPPLER RECEIVING STATIONS TO OBTAIN PRECISION SATELLITE RANGE-RATE DATA. THE DUAL FREQUENCIES WILL BE GENERATED BY A HIGHLY STABLE OSCILLATOR DRIVING TWO FREQUENCY MULTIPLIERS. BOTH FREQUENCIES WILL BE USED SIMULTANEOUSLY TO PROVIDE COMPARISON DATA OF THE EFFECT OF THE IONOSPHERE ON THE SIGNALS, WHICH WILL THEN BE USED TO CORRECT THE DATA FOR THIS ERROR SOURCE. THIRTEEN OR MORE FIXED GROUND RECEIVING STATIONS OPERATED BY THE U.S. NAVY DOPPLER TRACKING NETWORK (TRANET) AND 12 PORTABLE GEOCEIVERS OPERATED BY THE U.S. ARMY, U.S. NAVY, AND U.S. AIR FORCE - ALL UNDER THE DIRECTION OF THE DEFENSE MAPPING AGENCY (DMA) - ARE EXPECTED TO BE IN OPERATION. OBSERVATIONS MADE FROM THREE OR MORE KNOWN STATIONS WILL ALLOW DEDUCTION OF ORBITAL PARAMETERS. RANGE-RATE DATA FROM EITHER THE FIXED STATIONS OR THE GEOCEIVERS IS ESTIMATED TO BE ACCURATE WITHIN 0.5 CM/SEC. DATA FROM THE SYSTEM WILL BE RECORDED ON PAPER TAPE, THEN REPRODUCED ON MAGNETIC TAPE FOR FURTHER PROCESSING.

***** GMS *****

SPACECRAFT COMMON NAME- GMS
ALTERNATE NAMES- GEOSTATIONARY METEOROL SAT.
NSSDC ID- GMS

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 01/00/77 SPACECRAFT WEIGHT- 250. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- THOR-DELTA

SPONSORING COUNTRY/AGENCY
JAPAN NASA
JAPAN JNA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 1440. MIN INCLINATION- 0.0 DEG
PERIAPSIS- 36000. KM ALT APOAPSIS- 36000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWN *****NATL SATELL DEV AGCY
TOKYO, JAPAN

PS - UNKNOWN *****JAPANESE METEOROL AGCY
TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION

THE GEOSTATIONARY METEOROLOGICAL SATELLITE (GMS) WILL SERVE AS PART OF JAPAN'S CONTRIBUTION TO GARP (GLOBAL ATMOSPHERIC RESEARCH PROJECT). THE SPIN-STABILIZED SPACECRAFT WILL BE EQUIPPED WITH A VISUAL-INFRARED SENSOR TO PROVIDE NEAR-CONTINUOUS OBSERVATIONS OF VARIOUS WEATHER FEATURES. AS PART OF GARP, THE SATELLITE WILL HELP SUPPLY DATA REQUIRED FOR GLOBAL DATA SETS, TO BE USED IN IMPROVEMENT OF MACHINE WEATHER FORECASTS. IN GENERAL, THE SPACECRAFT DESIGN, INSTRUMENTATION, AND OPERATION WILL BE SIMILAR TO SMS/GOES.

***** GOES-D *****

SPACECRAFT COMMON NAME- GOES-B
ALTERNATE NAMES-
NSSDC ID- GOES-B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 3 OCT 76 SPACECRAFT WEIGHT- 243. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NOAA-NESS
UNITED STATES NASA-DA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 1440. MIN INCLINATION- 0.0 DEG
PERIAPSIS- 36700. KM ALT APOAPSIS- 36700. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.V. POROYCE *****NASA-GSFC
GREENBELT, MD
PS - W.E. SHENK *****NASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

GOES-D WILL BE A NASA-DEVELOPED, NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISUAL-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO PROVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM, (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LOCATED EARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENT MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SOLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAM AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 63 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A HONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SOLAR PANELS, WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

----- GOES-B, NESS STAFF -----

EXPERIMENT NAME- VISUAL-INFRARED SPIN-SCAN RADIOMETER (VISSR)

NSSDC ID- GOES-B -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFF *****NOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE VISUAL-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON GOES-B WILL BE CAPABLE OF PROVIDING BOTH DAY AND NIGHT OBSERVATIONS OF CLOUD COVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS, SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. BOTH THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRONS) WILL USE A COMMON OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHIEY-CHRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS, WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF

THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 10.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NAZIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO NAZIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES BETWEEN 100 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, WOLLOPS ISLAND, VA. THERE THE SIGNAL WILL BE PULSED INTO A 'LINE STRETCHER,' WHERE IT WILL BE STORED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REBROADCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL TYPE DATA, THE VISSR DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

----- GOES-B, UNKNOWN -----

EXPERIMENT NAME- METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM

NSSDC ID- GOES-B -05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN*****

EXPERIMENT BRIEF DESCRIPTION

THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEPAX TYPE) DATA FROM CENTRALIZED WEATHER FACILITIES TO EXISTING SMALL, GROUND-BASED APT RECEIVING STATIONS. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMALL METEOROLOGICAL SATELLITE WILL CONSIST OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCP STATION.

----- GOES-B, WILLIAMS -----

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR

NSSDC ID- GOES-B -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE-HEIGHT DISCRIMINATION, WILL BE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE AND ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 800 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

----- GOES-B, WILLIAMS -----

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NSSDC ID- GOES-B -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IONIZATION CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT

1.5 TO 2 ATMOSPHERE, AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.5-TO 3-A.

----- GOES-B, WILLIAMS -----

EXPERIMENT NAME- MAGNETIC FIELD MONITOR

NSSDC ID- GOES-B -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLE TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (APPROXIMATELY 2 FT) ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELF-CALIBRATED RANGE (40, 100, 200, 400 GAMMAS), AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAU-45 IN 40-GAMMA STEPS), AND AN INFLIGHT CALIBRATION CAPABILITY.

*****GOES-C *****

SPACECRAFT COMMON NAME- GOES-C

ALTERNATE NAMES-

NSSDC ID- GOES-C

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 4 QTR 76 SPACECRAFT WEIGHT- 243. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY

UNITED STATES NOAA-NESS
UNITED STATES NASA-OR

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 1440. MIN INCLINATION- 0.0 DEG
PERIAPSIS- 35700. KM ALT APDAPSIS- 35700. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.V. FORDYCE *****NASA-GSFC

PS - W.E. SHFNK *****NASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

GOES-C WILL BE A NASA-DEVELOPED, NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO PROVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM, (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LOCATED EARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENT MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SOLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 100.5 CM IN DIAM AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A HONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE APPLIED TO THE SOLAR PANELS, WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

----- GOES-C, NESS STAFF -----

EXPERIMENT NAME- VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)

NSSDC ID- GOES-C -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - NESS STAFF *****NOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON GOES-C WILL BE CAPABLE OF PROVIDING BOTH DAY AND

NIGHT OBSERVATIONS OF CLOUD COVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS, SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. BOTH THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRONS) WILL USE A COMMON OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHIEY-CHretien OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS, WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NAIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO NAIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES BETWEEN 180 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, WOLLOPS ISLAND, VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER," WHERE IT WILL BE STORED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REBROADCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL TYPE DATA, THE VISSR DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

----- GOES-C, UNKNOWN -----

EXPERIMENT NAME- METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM

NSSDC ID- GOES-C -05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN*****

EXPERIMENT BRIEF DESCRIPTION
THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEPAX TYPE) DATA FROM CENTRALIZED WEATHER FACILITIES TO EXISTING SMALL, GROUND-BASED APT RECEIVING STATIONS. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMALL METEOROLOGICAL SATELLITE WILL CONSIST OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCP STATION.

----- GOES-C, WILLIAMS -----

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR

NSSDC ID- GOES-C -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILORED MODULATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE-HIGHT DISCRIMINATION, WILL BE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE AND ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 500 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 7.5 MEV.

----- GOES-C, WILLIAMS -----

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NSSDC ID- GOES-C -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IONIZATION CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 6-A X RAYS AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES, AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.5 TO 3-A.

----- GOES-C, WILLIAMS -----

EXPERIMENT NAME- MAGNETIC FIELD MONITOR

NSSDC ID- GOES-C -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (APPROXIMATELY 2 FT) ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE RANGE (50, 100, 200, OR 400 GAMMAS), AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAMMAS IN 40-GAMMA STEPS), AND AN INFLIGHT CALIBRATION CAPABILITY.

***** GP-A *****

SPACECRAFT COMMON NAME- GP-A
ALTERNATE NAMES- GRAVITATIONAL REDSHIFT P, GRAVR-A
RELATIVITY
NSSDC ID- GRAVR-A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 1975 SPACECRAFT WEIGHT- 70. KG
LAUNCH SITE- WOLLOPS FLIGHT CENTER, UNITED STATES
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN
PERIAPSIS- KM ALT INCLINATION- DEG
APOAPSIS- 18530. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.S. STONE *****NASA-MSPC
HUNTSVILLE, AL
PS - R. DECKER *****NASA-MSPC
HUNTSVILLE, AL

SPACECRAFT BRIEF DESCRIPTION
THIS SPACECRAFT WILL CARRY ONE EXPERIMENT ON A FLIGHT OF ABOUT 3.5 HR TO AN ALTITUDE NEAR 18,530 KM. THE SPACECRAFT WILL WEIGH ABOUT 60 KG. UPON COMPLETION OF THE FLIGHT, THE SPACECRAFT SHOULD IMPACT IN THE ATLANTIC OCEAN NEAR BERMUDA. THE SPACECRAFT WILL BE PROVIDED WITH CONTINUOUS TRACKING AND TELEMETRY FROM WOLLOPS ISLAND AND BERMUDA. IT IS PLANNED TO STUDY GRAVITATIONAL EFFECT ON TIME MEASUREMENTS (RELATIVISTIC OR EINSTEIN REDSHIFT) BY USE OF A HYDROGEN MASER OSCILLATOR SYSTEM (CLOCK). THIS IS TO VERIFY ONE OF THE RESULTS EXPECTED FROM EINSTEIN'S GENERAL THEORY OF RELATIVITY. THE SPACECRAFT SUPPORT EXPERIMENT WILL CONSIST OF AN S-BAND TELEMETRY TRANSPONDER, A BATTERY, AND A COOLING SYSTEM.

----- GP-A, VESSOT -----

EXPERIMENT NAME- GRAVITATIONAL POTENTIAL AS A FUNCTION OF TIME

NSSDC ID- GRAVR-A-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.F.C. VESSOT *****SAO
CAMBRIDGE, MA
OI - M.W. LEVINE *****SAO
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS INTENDED TO STUDY THE RELATION BETWEEN TIME PASSAGE AND GRAVITATIONAL POTENTIAL, ACCORDING TO THE EINSTEIN GENERAL THEORY. TIME (FREQUENCY OF AN OSCILLATOR) PASSES SLOWER IN A STRONG GRAVITATIONAL FIELD, THAN IN A WEAKER FIELD (FREQUENCY SHIFT TOWARD THE RED, OR SLOWER

FREQUENCY, END OF THE VISIBLE SPECTRUM). FREQUENCY COMPARISONS OF EQUIVALENT HYDROGEN MASER OSCILLATORS ON THE SPACECRAFT AND ON THE EARTH SHOULD PROVIDE OBSERVATIONAL SUPPORT OF THIS EFFECT. RELATIVISTIC FREQUENCY SHIFTS ARE EXPECTED TO OCCUR AS A RESULT OF BOTH VEHICLE VELOCITY AND CHANGE IN GRAVITATIONAL POTENTIAL. TWO SEPARATE SYSTEMS WILL BE USED TO MEASURE THESE SHIFTS. ONE SYSTEM WILL MEASURE THE ELAPSED PHASE CHANGES IN THE TRANSMISSION PATH, THE OTHER WILL MEASURE THE PHASE OF THE SPACECRAFT OSCILLATOR AS RECEIVED VIA THE TRANSMISSION PATH AND COMPARED TO THE EARTH-BASED OSCILLATOR. PHASE CHANGES IN THE TRANSMISSION PATH DUE TO ATMOSPHERIC EFFECTS, IONOSPHERIC EFFECTS, AND RANGE VARIATION WILL BE AUTOMATICALLY AND COHERENTLY CORRECTED.

***** HAWKEYE 1 *****

SPACECRAFT COMMON NAME- HAWKEYE 1
ALTERNATE NAMES- INJUN-P, NEUTRAL POINT EXPLORER
EXPLORER 52

NSSDC ID- 74-040A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/03/74.

LAUNCH DATE- 06/03/74 SPACECRAFT WEIGHT- 26.1 KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 06/03/74
ORBIT PERIOD- 3032. MIN INCLINATION- 89.78 DEG
PERIAPSIS- 6848. KM ALT APOAPSIS- 131948. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 09/16/74
ORBIT PERIOD- 3077. MIN INCLINATION- 89.84 DEG
PERIAPSIS- 8025. KM ALT APOAPSIS- 132130. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.W. COFFEY, JR.U OF IOWA
IOWA CITY, IA
PS - J.A. VAN ALLENU OF IOWA
IOWA CITY, IA

SPACECRAFT BRIEF DESCRIPTION
HAWKEYE WAS PART OF THE U.S. CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE MAIN PURPOSE OF THIS FLIGHT WAS TO STUDY THE NEUTRAL POINT REGION OF THE MAGNETOSPHERE. THE EXPERIMENTS INCLUDED PARTICLE AND FIELD OBSERVATIONS AND LOW-ENERGY PLASMA STUDIES RELEVANT TO THE DYNAMICS OF SOLAR WIND INJECTION INTO THE MAGNETOSPHERE. THE SPACECRAFT WAS SPIN-STABILIZED WITH A SPIN RATE OF ABOUT 6 RPM AND A SPIN VECTOR PARALLEL TO THE EARTH'S EQUATORIAL PLANE. INITIAL APOGEE POSITION WAS OVER THE EARTH'S POLAR CAP IN THE NOON-DUSK QUADRANT. INITIAL SPACECRAFT AND EXPERIMENT PERFORMANCE WAS NORMAL.

***** HAWKEYE 1, FRANK *****

EXPERIMENT NAME- LOW-ENERGY PROTONS AND ELECTRONS

NSSDC ID- 74-040A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/03/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - L.A. FRANKU OF IOWA
IOWA CITY, IA
OI - J.C. CRAVENU OF IOWA
IOWA CITY, IA
OI - D.W. YEAGERU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF ONE LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEDEDA) ORIENTED PERPENDICULAR TO THE SATELLITE SPIN AXIS. THE LEDEDA MEASURED PROTONS AND ELECTRONS IN 16 CHANNELS OVER AN ENERGY RANGE OF 90 EV TO 50 KEV. THE EXPERIMENT SURVEYED THE PARTICLE ENVIRONMENT OF THE MAGNETOSPHERE, ESPECIALLY NEAR THE POLAR CURVES.

***** HAWKEYE 1, GURNETT *****

EXPERIMENT NAME- ELF/VLF RECEIVERS

NSSDC ID- 74-040A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/03/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - G.W. PFEIFFERU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF TWO DETECTORS -- (1) A 16-CHANNEL SPECTRUM ANALYZER COVERING THE FREQUENCY RANGE FROM 10 HZ TO 178 KHZ WITH LOGARITHMIC SPACING AND (2) A WIDE-BAND

RECEIVER COVERING THE FREQUENCY RANGE FROM 10 HZ TO 10 KHZ. THE SIGNALS FROM THE FIRST DETECTOR WERE SENT TO GROUND STATIONS DIRECTLY IN DIGITAL FORM, WHEREAS THE OUTPUT FROM THE SECOND DETECTOR WAS TRANSMITTED TO GROUND STATIONS IN ANALOG FORM. BOTH DETECTORS WERE USED IN CONNECTION WITH EITHER OF TWO ANTENNAS -- AN ELECTRIC DIPOLE ABOUT 42 METERS IN LENGTH FROM TIP TO TIP AND A SEARCH COIL ANTENNA. THE EXPERIMENT MEASURED PLASMA WAVES IN THE MAGNETOSPHERE ESPECIALLY NEAR THE POLAR CURVES.

***** HAWKEYE 1, VAN ALLEN *****

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETER

NSSDC ID- 74-040A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/03/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.A. VAN ALLENU OF IOWA
IOWA CITY, IA
OI - M.N. OLIVENU OF IOWA
IOWA CITY, IA
OI - L.J. CAHILL, JR.U OF MINNESOTA
MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF A TRIAXIAL FLUXGATE MAGNETOMETER CAPABLE OF OPERATION AT TWO LEVELS, LOW GAIN AND HIGH GAIN. IN THE HIGH-GAIN MODE THE MAGNETOMETER RANGE IS FROM ABOUT 0.1 TO 100 GAMMA (STRAY SATELLITE MAGNETIC FIELDS ARE TO BE CONSTRAINED TO LESS THAN 0.1 GAMMA). IN THE LOW-GAIN MODE THE MAGNETOMETER RANGE IS FROM 100 TO ABOUT 1000 GAMMA. THE EXPERIMENT SURVEYED THE MAGNETIC FIELDS IN THE MAGNETOSPHERE, ESPECIALLY NEAR THE POLAR CURVES.

***** HCMH *****

SPACECRAFT COMMON NAME- HCMH
ALTERNATE NAMES- SATS, SMALL APPLICATIONS TECH
HEAT CAPACITY MAP MSN

NSSDC ID- AEM-A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 09/00/77 SPACECRAFT WEIGHT- 117. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- SCOUT-F

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-0A

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 1440. MIN INCLINATION- DEG
PERIAPSIS- 600. KM ALT APOAPSIS- 600. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - P.G. MARCOTTENASA-GSFC
GREENBELT, MD
PS - W.A. HOVISNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE OBJECTIVE OF THE HEAT CAPACITY MAPPING MISSION (HCMH) SPACECRAFT WILL BE TO PROVIDE COMPREHENSIVE, ACCURATE, HIGH SPATIAL RESOLUTION THERMAL SURVEYS OF THE SURFACE OF THE EARTH. THE SPACECRAFT WILL BE SPIN STABILIZED AT A RATE OF 14 RPM. THE HCMH CIRCULAR SUN-SYNCHRONOUS ORBIT WILL BE CHOSEN TO ALLOW THE SPACECRAFT TO SENSE SURFACE TEMPERATURE NEAR THE MAXIMUM AND MINIMUM OF THE DIURNAL CYCLE. THE ORBIT WILL HAVE AN ASCENDING DAYLIGHT NOOD WITH NOMINAL EQUATORIAL CROSSING TIME OF 2 PM, AND WILL PROVIDE A ONE-THIRTY PM TO TWO-THIRTY AM CROSSING TIME OVER MIDDLE NORTHERN LATITUDES. THE ORBIT WILL ALSO ALLOW FOR REFLECTANCE MEASUREMENTS DURING DAYLIGHT PASSES.

***** HCMH, HOVIS *****

EXPERIMENT NAME- HEAT CAPACITY MISSION RADIOMETER

NSSDC ID- AEM-A -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.A. HOVISNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE OBJECTIVES OF THE HEAT CAPACITY MAPPING RADIOMETER (HCMR) WILL BE AS FOLLOWS -- (1) TO PRODUCE THERMAL MAPS AT THE OPTIMUM TIMES FOR MAKING THERMAL INERTIA STUDIES FOR DISCRIMINATION OF ROCK TYPES AND MINERAL RESOURCES LOCATION, (2) TO MEASURE PLANT CANOPY TEMPERATURES AT FREQUENT INTERVALS TO DETERMINE THE TRANSPIRATION OF WATER AND PLANT LIFE, (3) TO MEASURE SOIL MOISTURE EFFECTS BY OBSERVING THE TEMPERATURE CYCLE OF SOILS, (4) TO MAP THERMAL EFFLUENTS, BOTH NATURAL AND MAN-MADE, (5) TO INVESTIGATE THE FEASIBILITY OF GEOTHERMAL SOURCE LOCATION BY REMOTE SENSING, AND (6) TO PROVIDE FREQUENT COVERAGE OF SNOW FIELDS FOR WATER RUNOFF PREDICTION. THE HCMR WILL TRANSMIT ANALOG DATA IN REAL TIME TO SELECTED RECEIVING STATIONS. IT IS DESIGNED TO PROVIDE ACCURATE, HIGH SPATIAL

RESOLUTION THERMAL MAPS OF THE SURFACE OF THE EARTH AT AN OPTIMUM TIME FOR DETERMINATION OF THERMAL INERTIA. THE HIGH THERMAL RESOLUTION DATA WILL ALSO BE USED TO MAP THERMAL GRADIENTS IN BODIES OF WATER. THE RADIOMETER TO BE USED WILL BE SIMILAR TO THE HIGH-RESOLUTION SURFACE COMPOSITION MAPPING RADIOMETER (HRS-CMR) OF NIMBUS 5 (72-097A). THE CMR WILL HAVE A SMALL INSTANTANEOUS GEOMETRIC FIELD OF VIEW (LESS THAN 1 X 1 MILLIRADIANS), HIGH RADIOMETRIC ACCURACY, AND A WIDE ENOUGH SWATH COVERAGE ON THE GROUND SO THAT SELECTED AREAS ARE COVERED WITHIN THE 12-HR PERIOD CORRESPONDING TO THE MAXIMUM AND MINIMUM OF TEMPERATURE OBSERVED. THE INSTRUMENT WILL OPERATE IN TWO CHANNELS, 10.5 TO 12.5 MICROMETERS (IR) AND 0.8 TO 1.1 MICROMETERS (VISIBLE). THE LATTER CHANNEL WILL BE MATCHED TO THE ERIS-1 (72-050A) BAND 4. THE INSTRUMENT IS TO UTILIZE A RADIATION COOLER TO COOL THE TWO HE-CD-TE DETECTORS TO 100 DEG K. THE EXPERIMENT WILL INCLUDE AN ANALOG MULTIPLEXER THAT WILL ACCEPT THE ANALOG OUTPUT OF EACH DETECTOR AND MULTIPLEX THEM IN A FORM SUITABLE FOR TRANSMISSION BY THE SPACECRAFT S-BAND TRANSMITTER. IT IS PLANNED TO MAKE THE DATA GENERALLY AVAILABLE THROUGH THE ERIS DATA CENTER, SIOUX FALLS, S.D. MORE COMPLETE INFORMATION CAN BE FOUND IN SMITH, G.R., APPLICATIONS EXPLORER MISSIONS (AEM) MISSION PLANNER'S HANDBOOK.

***** HEAD-A *****

SPACECRAFT COMMON NAME- HPAQ-A
ALTERNATE NAMES-
NSSDC ID- HEAD-A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 1977 SPACECRAFT WEIGHT- 3000. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-NSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 90. MIN INCLINATION- 22.5 DEG
PERIAPSIS- 410. KM ALT APOAPSIS- 410. KM ALT

SPACECRAFT PERSONNEL (PI=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PI - F.A. SPERNASA-HSFC
HUNTSVILLE, AL
PS - F.B. McDONALDNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE OBJECTIVE OF THE HIGH-ENERGY ASTRONOMY OBSERVATORIES WILL BE TO CONDUCT COORDINATE RESEARCH INTO X-RAY AND GAMMA-RAY ASTRONOMY AND COSMIC-RAY ASTROPHYSICS. THE HEAD SPACECRAFT WILL BE DESIGNED TO CARRY THE LARGE AND HEAVY SCIENTIFIC INSTRUMENTATION REQUIRED TO CONDUCT OBSERVATIONS AT THE VERY-HIGH-ENERGY AND LOW-FLUX LEVELS OF THESE PHENOMENA. THE PRIME OBJECTIVE OF THIS MISSION WILL BE TO CONDUCT AN X-RAY SKY SURVEY.

***** HEAD-A. HOLDT *****

EXPERIMENT NAME- COSMIC X-RAY EXPERIMENT

NSSDC ID- HEAD-A -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - E.A. HOLDTNASA-GSFC
GREENBELT, MD
OI - G.P. GARMIRECALIF INST OF TECH
PASADENA, CA
OI - C.S. BOWYERU OF CALIF, BERKELEY
BERKELEY, CA
OI - R. CRUNDANCEU OF CALIF, BERKELEY
BERKELEY, CA
OI - G.B. FIELDSAD
CAMBRIDGE, MA
OI - M.L. LAHTONU OF CALIF, BERKELEY
BERKELEY, CA
OI - J.L. SILKU OF CALIF, BERKELEY
BERKELEY, CA
OI - S.S. HOLDTNASA-GSFC
GREENBELT, MD
OI - G. AGRAWALCALIF INST OF TECH
PASADENA, CA
OI - G.R. RIEGLERBERNIX CORP
ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE USED TO MAP THE X-RAY SKY IN THE RANGE FROM 0.2 TO 60 KEV, EMPHASIZING BRIGHTNESS DISTRIBUTION OF THE DIFFUSE BACKGROUND, CORRELATION OF GALACTIC RADIO EMISSION AND X-RAY EMISSION FROM COSMIC RAY ELECTRONS, AND RELATIVE EMISSION AND ABSORPTION BY INTERSTELLAR MATTER. SIX THIN-WINDOW PROPORTIONAL COUNTERS COVERING THE RANGE FROM 0.2 TO 6 KEV, 1.5 TO 15 KEV, AND 1 TO 60 KEV, AND COLLIMATED TO FIELDS OF VIEW OF 1.5 X 3 DEG, 1 X 3 DEG, OR 3 X 6 DEG, WILL BE USED. THE TOTAL DETECTOR AREA WILL BE 1.32 M SQ.

***** HEAD-A. FRIEDMAN *****

EXPERIMENT NAME- LARGE AREA COSMIC X-RAY SURVEY

NSSDC ID- HEAD-A -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.D. FRIEDMANUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - T.A. CHUDNUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - E.T. DYRAHUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - G.G. FRITZUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - J.F. WICKINSUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - F. SCHULMANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MAP THE X-RAY SKY FROM 0.15 TO 20 KEV WITH HIGH SENSITIVITY AND MODERATE ANGULAR AND ENERGY RESOLUTION TO LOCATE X-RAY SOURCES WITH SUFFICIENT ACCURACY AND TO DETERMINE THE NATURE AND EXTENT OF BOTH GALACTIC AND EXTRAGALACTIC SOURCES. SIX PROPORTIONAL COUNTER MODULES WILL BE USED, WITH COLLIMATIONS OF 1 X 4 DEG, 1 X 0.5 DEG, OR 2 X 8 DEG, DEPENDING UPON THE MODULE.

***** HEAD-A. GURSKY *****

EXPERIMENT NAME- X-RAY SCANNING MODULATION COLLIMATOR

NSSDC ID- HEAD-A -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H. GURSKYHARVARD COLLEGE OBS
CAMBRIDGE, MA
OI - H.V.D. BRADYMASS INST OF TECH
CAMBRIDGE, MA
OI - G.W. CLARKMASS INST OF TECH
CAMBRIDGE, MA
OI - W.H.G. LEWINMASS INST OF TECH
CAMBRIDGE, MA
OI - S. RAPPAPORTMASS INST OF TECH
CAMBRIDGE, MA
OI - G. SPADAMASS INST OF TECH
CAMBRIDGE, MA
OI - R. DORSEYMASS INST OF TECH
CAMBRIDGE, MA
OI - R. GIACCONEHARVARD COLLEGE OBS
CAMBRIDGE, MA
OI - P. GORENSTEINHARVARD COLLEGE OBS
CAMBRIDGE, MA
OI - E.W. KELLOGGHARVARD COLLEGE OBS
CAMBRIDGE, MA
OI - H. TANENBAUMHARVARD COLLEGE OBS
CAMBRIDGE, MA
OI - D. SCHWARTZASTE, INC
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WILL BE (1) TO DETERMINE THE CELESTIAL POSITIONS OF COSMIC X-RAY SOURCES TO A PRECISION OF ABOUT 5 ARC-SEC, (2) TO DETERMINE THE ANGULAR SIZE OF COSMIC X-RAY SOURCES TO A PRECISION OF ABOUT 5 TO 10 ARC-SEC IN THE ENERGY RANGE FROM 1.0 TO 15 KEV, AND (3) TO STUDY THE STRUCTURE OF THE X-RAY EMISSION TO A PRECISION OF 10 ARC-SEC IN THE ENERGY RANGE FROM 1.0 TO 15 KEV. THE EXPERIMENT WILL CONSIST OF TWO INDEPENDENT MODULATION COLLIMATOR BANKS TO SCAN THE CELESTIAL SPHERE IN THE Y-DIRECTION. EACH BANK WILL HAVE A SERIES OF FOUR WIRE GRIDS, WHICH WILL FORM A SERIES OF TRIANGULAR ACCEPTANCE PATTERNS. THE FWHM OF THE TRIANGULAR RESOLUTION ELEMENTS WILL BE 30 ARC-SEC FOR ONE COLLIMATOR BANK AND 120 ARC-SEC FOR THE OTHER. IN ADDITION, EACH BANK WILL HAVE AN EGG-CRATE COLLIMATOR TO LIMIT THE VIEW TO 4-DEG X 0-DEG FWHM. THERE WILL BE FOUR SEALED PROPORTIONAL COUNTERS ASSOCIATED WITH EACH BANK. THE COUNTERS WILL HAVE 25-MICRON BERYLLIUM WINDOWS AND WILL BE FILLED WITH A MIXTURE OF 90-PERCENT ARGON AND 10-PERCENT CARBON DIOXIDE TO A PRESSURE SLIGHTLY GREATER THAN 1 ATM.

***** HEAD-A. PETERSON *****

EXPERIMENT NAME- LOW-ENERGY GAMMA-RAY AND HARD X-RAY SKY SURVEY

NSSDC ID- HEAD-A -04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - L.E. PETERSONU OF CALIF, SAN DIEGO
LA JOLLA, CA
OI - W.H.G. LEWINMASS INST OF TECH
CAMBRIDGE, MA

REPRODUCIBILITY OF THE
ORIGINAL DATA IS POOR

OI - R.W. PELLINGU OF CALIF. SAN DIEGO
 SAN DIEGO, CA
 OI - J.L. MATTESONU OF CALIF. SAN DIEGO
 SAN DIEGO, CA
 OI - A. SCHEEFMAKERU OF CALIF. SAN DIEGO
 SAN DIEGO, CA
 OI - H.V.D. BRADYMASS INST OF TECH
 CAMBRIDGE, MA
 OI - G.W. CLARKMASS INST OF TECH
 CAMBRIDGE, MA
 OI - S. RAPPAPORTMASS INST OF TECH
 CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
 THE PURPOSE OF THIS EXPERIMENT WILL BE TO SEARCH THE
 CELESTIAL SPHERE FOR PHENOMENA IN THE ENERGY RANGE FROM 0.01
 TO 10 MEV. THE SEARCH WILL BE ORIENTED TO THE GATHERING OF
 DATA WITHIN TWO DISTINCT ENERGY BANDS - 10 TO 200 KEV. AND 0.1
 TO 10 MEV. WITHIN THE 10- TO 200-KEV REGION, EMPHASIS WILL BE
 PLACED ON THE FOLLOWING TYPE OF STUDIES. DETERMINATIONS WILL
 BE MADE OF THE INTENSITY AND SPECTRA OF POINT X-RAY SOURCES.
 AT A SENSITIVITY OF 7E-4 PHOTONS/CM SQ/SEC. STUDIES WILL BE
 MADE TO FIX THE POSITIONS OF STRONG SOURCES (1.6E-2 PHOTONS/CM
 SQ/SEC OR MORE) TO 0.1 DEGREE, AND TO ABOUT 1 DEG FOR
 THRESHOLD SOURCES. SEARCHES WILL BE MADE FOR TRANSIENT
 THRESHOLD SOURCES. ALL PERIODIC AND NON-PERIODIC TIME VARIATIONS IN ANY
 SOURCE ENCOMPASSED BY THIS INVESTIGATION WILL BE AT A TIME
 RESOLUTION OF APPROXIMATELY 50 MICRO-SECONDS. WORK IN THE
 0.1- TO 10-MEV RANGE WILL ADDRESS THREE FUNDAMENTAL STUDIES --
 (1) MEASUREMENT OF THE SPECTRUM AND ISOTROPY OF THE DIFFUSE
 AND THE GALACTIC GAMMA RAYS, (2) MEASUREMENT OF THE SPECTRUM
 AND TIME VARIATIONS OF STRONG GALACTIC AND EXTRAGALACTIC POINT
 SOURCES AND, (3) DETERMINATION OF VARIOUS BACKGROUND
 COMPONENTS AND PRODUCTION EFFECTS NEEDED TO INTERPRET THE
 ABOVE DATA, AND TO PROVIDE INFORMATION FOR FUTURE MISSIONS
 SUCH AS THE SHUTTLE. THE EXPERIMENTAL PACKAGE WILL CONTAIN
 SEVEN PHOSWICH DETECTORS, SHIELDED BY ACTIVE COLLIMATOR
 ANTI-COINCIDENCE CRYSTALS. TO RECORD THE ENERGETIC PHOTONS IN
 THE ENERGY RANGE FROM 0.01 TO 10 MEV, ONE DETECTOR WILL BE
 COLLIMATED WITH A 2-DEG SLOT COLLIMATOR TO GIVE HIGH ANGULAR
 RESOLUTION AT THE LOW ENERGIES. ITS FIELD OF VIEW WILL BE 2
 BY 20 DEG. THE OTHER DETECTORS WILL HAVE A FIELD OF VIEW OF
 20 BY 40 DEG. A CESIUM IODIDE BLOCKING CRYSTAL WILL BE
 POSITIONED OVER THE APERTURE OF A DETECTOR TO RECORD THE
 BACKGROUND EVENTS IN THE DETECTOR.

***** HEAD-B *****

SPACECRAFT COMMON NAME- HEAD-B
 ALTERNATE NAMES-
 NSSDC ID- HEAD-B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 2HALF 78 SPACECRAFT WEIGHT- 3000. KG
 LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
 LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY
 UNITED STATES NASA-055

PLANNED ORBIT PARAMETERS
 ORBIT TYPE- GEOCENTRIC
 ORBIT PERIOD- 90. MIN INCLINATION- 22.5 DEG
 PERIAPSIS- 435. KM ALT APOAPSIS- 435. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PM - F.A. SPEERNASA-MSFC
 HUNTSVILLE, AL
 PS - S.S. HOLTNASA-GSFC
 GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
 THE OBJECTIVE OF THE HIGH-ENERGY ASTRONOMY OBSERVATORIES
 WILL BE TO CONDUCT COORDINATED RESEARCH INTO X-RAY AND
 GAMMA-RAY ASTRONOMY AND COSMIC-RAY ASTROPHYSICS. THE HEAD
 SPACECRAFT WILL BE DESIGNED TO CARRY THE LARGE AND HEAVY
 SCIENTIFIC INSTRUMENTATION REQUIRED TO CONDUCT OBSERVATIONS AT
 THE VERY-HIGH-ENERGY AND LOW-FLUX LEVELS OF THESE PHENOMENA.
 THIS MISSION WILL UTILIZE A POINTED X-RAY TELESCOPE. HEAD-B
 WILL CARRY A GRAZING INCIDENCE X-RAY TELESCOPE POINTED AT
 VARIOUS X-RAY SOURCES.

***** HEAD-B, BOLDT *****

EXPERIMENT NAME- SOLID-STATE X-RAY DETECTOR

NSSDC ID- HEAD-B -05

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - E.A. BOLDTNASA-GSFC
 GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
 THIS INSTRUMENT WILL BE A COOLED SOLID-STATE
 SPECTROMETER AND WILL BE USED TO DETECT WEAK SOURCES AND WEAK
 SPECTRAL FEATURES OVER A BROAD BAND OF ENERGIES BY EMPLOYING A
 NONDISPERSIVE SPECTRAL TECHNIQUE. A LITHIUM-DRIED
 SOLID-STATE DETECTOR WILL BE OPERATED AT A TEMPERATURE OF 120
 DEG K. THE PRIMARY DETECTOR WILL BE 6 MM IN DIAMETER AND WILL
 BE SURROUNDED BY TWO VETO GUARD COUNTERS. A TWO-STAGE SOLID
 CRYOGEN REFRIGERATOR WILL BE USED TO COOL THE DETECTOR.
 SPECTRAL MEASUREMENTS WILL BE MADE BETWEEN 0.5 AND 4 KEV, WITH

A RESOLUTION FROM 120 TO 150 EV. FWHM AND AN EFFICIENCY
 GREATER THAN 0.9.

***** HEAD-B, CLARK *****

EXPERIMENT NAME- A CURVED-CRYSTAL BRAGG X-RAY SPECTROMETER

NSSDC ID- HEAD-B -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - G.W. CLARKMASS INST OF TECH
 CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
 THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO SEARCH FOR
 X-RAY SPECTRAL LINE EMISSIONS ARISING FROM THE SELECTED
 CELESTIAL OBJECTS. THE SEARCH WILL BE LIMITED TO THE ENERGY
 LEVEL FROM 0.1 TO 3 KEV. THE INSTRUMENT WILL BE A
 CURVED-CRYSTAL BRAGG SPECTROMETER USING SIX CRYSTALS. THE
 SELECTION OF SPECIFIC CRYSTALS WILL BE MADE FROM AMONG PET,
 ADP, BERYL, PAP, LEAD LAURATE, AND LEAD STEARATE. THE
 SPECTROGRAPH RESOLUTION WILL DEPEND ON THE FINAL SELECTION OF
 CRYSTALS. PAP AND ADP WOULD GIVE RESOLUTIONS IN
 LAMDA/DELTA-LAMDA OF GREATER THAN 2500. LEAD STEARATE AND
 LAURATE WOULD GIVE RESOLUTIONS OF APPROXIMATELY 100. THE
 X-RAY LINES WILL BE DETECTED BY A THIN-WINDOW
 POSITION-SENSITIVE PROPORTIONAL COUNTER.

***** HEAD-B, GIACCONI *****

EXPERIMENT NAME- MONITOR PROPORTIONAL COUNTER

NSSDC ID- HEAD-B -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - R. GIACCONIHARVARD COLLEGE OBS
 CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT WILL UTILIZE A MONITOR COUNTER AS A
 SUPPORT INSTRUMENT FOR CALIBRATION AND NORMALIZATION OF THE
 FOC. PLANE INSTRUMENTATION. IT WILL BE USED TO (1) NORMALIZE
 INTENSITY FLUCTUATIONS DURING SPECTROMETER OBSERVATIONS, (2)
 OBSERVE THE CONTINUUM DURING SPECTRAL LINE OBSERVATIONS, AND
 (3) CALIBRATE CERTAIN INSTRUMENTS IN FLIGHT.

***** HEAD-B, GIACCONI *****

EXPERIMENT NAME- HIGH RESOLUTION IMAGER

NSSDC ID- HEAD-B -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - R. GIACCONIHARVARD COLLEGE OBS
 CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
 THE OBJECTIVES OF THIS EXPERIMENT WILL BE TO (1) DETECT
 AND ACCURATELY LOCATE X-RAY SOURCES IN THE ENERGY RANGE FROM
 0.2 TO 4 KEV, (2) STUDY THE STRUCTURE OF OBJECTS LARGER THAN 2
 ARC-SEC. AND (3) MEASURE THE INTENSITY AND TEMPORAL
 CHARACTERISTICS OF INDIVIDUAL POINT SOURCES.

***** HEAD-B, GURSKY *****

EXPERIMENT NAME- IMAGING PROPORTIONAL COUNTER

NSSDC ID- HEAD-B -04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - H. GURSKYHARVARD COLLEGE OBS
 CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
 THE OBJECTIVES OF THIS EXPERIMENT WILL BE -- (1) TO
 SURVEY X-RAY SOURCES OF AN EXTENDED NATURE IN THE ENERGY RANGE
 FROM 0.1 TO 4 KEV, WHERE RESOLUTION OF 1 ARC-MIN WILL BE
 SUFFICIENT, (2) TO STUDY THE ANGULAR STRUCTURE OF EXTENDED
 SOURCES, (3) TO SURVEY FOR WEAK SOURCES, AND (4) TO LOCATE
 OBJECTS WITH POORLY KNOWN POSITIONS.

***** HEAD-C *****

SPACECRAFT COMMON NAME- HEAD-C
 ALTERNATE NAMES-
 NSSDC ID- HEAD-C

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 2HALF 79 SPACECRAFT WEIGHT- 3000. KG
 LAUNCH SITE- CAPE CANAVERAL, UNITED STATES

LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 90. MIN INCLINATION- 50. DEG
PERIAPSIS- 480. KM ALT APOAPSIS- 480. KM ALT

SPACECRAFT PERSONNEL (PI=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PI - F.A. SPEERNASA-MSFC HUNTSVILLE, AL
PS - T.A. PARNELLNASA-MSFC HUNTSVILLE, AL

SPACECRAFT BRIEF DESCRIPTION
THE OBJECTIVE OF THE HIGH-ENERGY ASTRONOMY OBSERVATORIES WILL BE TO CONDUCT COORDINATED RESEARCH INTO X-RAY AND GAMMA-RAY ASTRONOMY AND COSMIC-RAY ASTROPHYSICS. THE HEAD SPACECRAFT WILL BE DESIGNED TO CARRY LARGE AND HEAVY SCIENTIFIC INSTRUMENTATION REQUIRED TO CONDUCT OBSERVATIONS AT THE VERY-HIGH-ENERGY AND LOW-FLUX LEVELS OF THESE PHENOMENA. THIS MISSION WILL EMPHASIZE GAMMA-RAY ASTRONOMY AND COSMIC-RAY ASTROPHYSICS.

----- HEAD-C. ISRAEL -----

EXPERIMENT NAME- HEAVY NUCLEII EXPERIMENT

NSSDC ID- HEAD-C -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - M.H. ISRAELWASHINGTON U ST. LOUIS, MO
DI - W.R. GINNSMC DONNELL-DOUGLAS CORP ST. LOUIS, MO
DI - J. KLARMANNWASHINGTON U ST. LOUIS, MO
DI - R.E. VOGTCALIF INST OF TECH PASADENA, CA
DI - E.C. STONECALIF INST OF TECH PASADENA, CA
DI - C.J. WADDINGTONU OF MINNESOTA MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WILL BE TO MEASURE THE CHARGE SPECTRUM OF COSMIC-RAY NUCLEI OVER THE NUCLEAR CHARGE RANGE FROM 17 TO 120 IN THE ENERGY INTERVAL 0.3-TO 10-GEV/NUCLEON TO CHARACTERIZE COSMIC RAY SOURCES, PROCESSES OF SYNTHESIS, AND PROPAGATION MODES. THE DETECTOR WILL CONSIST OF A DOUBLE-ENDED INSTRUMENT OF UPPER AND LOWER HODOSCOPES AND THREE DUAL-AN ION CHAMBERS. THE TWO ENDS WILL BE SEPARATED BY A CERENKOV RADIATOR. THE GEOMETRICAL FACTOR WILL BE A 4 SQ-M STER. THE ION CHAMBERS CAN RESOLVE CHARGE TO 0.24-CHARGE UNITS AT LOW ENERGY AND 0.30-CHARGE UNITS AT HIGH ENERGY AND HIGH Z. THE CERENKOV COUNTER CAN RESOLVE 0.3-TO 0.4-CHARGE UNITS.

----- HEAD-C. JACOBSON -----

EXPERIMENT NAME- GAMMA-RAY LINE SPECTROMETER

NSSDC ID- HEAD-C -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - A.S. JACOBSONNASA-JPL PASADENA, CA
DI - J.R. ARYOLDU OF CALIF. SAN DIEGO LA JOLLA, CA
DI - A.E. METZGERNASA-JPL PASADENA, CA
DI - L.E. PETERSONU OF CALIF. SAN DIEGO LA JOLLA, CA

EXPERIMENT BRIEF DESCRIPTION
THE BASIC GOALS OF THIS EXPERIMENT WILL BE TO SEARCH FOR GAMMA-RAY LINE EMISSIONS ARISING FROM A VARIETY OF SOURCE PHENOMENA. PARTICULAR EMPHASIS WILL BE PLACED ON FINDING LINE EMISSIONS FROM NUCLEOSYNTHESIS PROCESSES IN SUPERNOVAE, AND FROM POSITRON-ELECTRON ANNIHILATION AND NUCLEAR REACTIONS IN LOW-ENERGY COSMIC RAYS. IN ADDITION, CAREFUL STUDY WILL BE MADE OF THE SPECTRA AND TIME VARIATIONS OF KNOWN HARD X-RAY SOURCES. THE EXPERIMENT WILL BE CAPABLE OF MEASURING GAMMA-RAY LINES FALLING WITHIN THE ENERGY INTERVAL FROM 0.06 TO 10 MEV, AND WITH AN ENERGY RESOLUTION BETTER THAN 2.5 KEV AT 1.33 MEV AT A LINE SENSITIVITY FROM 1E-4 TO 1E-5 PHOTONS/CM SQ/SEC, DEPENDING ON THE ENERGY. THE EXPERIMENTAL PACKAGE WILL CONTAIN FOUR COOLED DRIFTED GERMANIUM DETECTORS SHIELDED BY CESIUM IODIDE. THE KEY EXPERIMENTAL PARAMETERS WILL BE -- (1) GEOMETRY FACTOR OF 11.1 SQ-CH STER, (2) A FIELD OF VIEW OF 27 DEG FWHM AND, (3) A TIME RESOLUTION OF LESS THAN 0.1 MSEC FOR THE GERMANIUM DETECTOR AND 10 SEC FOR THE CESIUM IODIDE DETECTOR.

----- HEAD-C. KOCH -----

EXPERIMENT NAME- ISOTOPIC COMPOSITION OF COSMIC RAYS

NSSDC ID- HEAD-C -04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - L. KOCHCENS SACLAY, FRANCE
DI - J.P. MEYERCENS SACLAY, FRANCE
DI - D. ROUSSELCENS SACLAY, FRANCE
DI - A. SOUTOUCENS SACLAY, FRANCE
DI - M. CASSECENS SACLAY, FRANCE
DI - P. MESTREAUCENS SACLAY, FRANCE
DI - N. LUNDDANISH SPACE RES INST LYNGBY, DENMARK
DI - K. OMDANISH SPACE RES INST LYNGBY, DENMARK
DI - O. CORYDON-PETERSONDANISH SPACE RES INST LYNGBY, DENMARK
DI - O. PETERSDANISH SPACE RES INST LYNGBY, DENMARK

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE RELATIVE COMPOSITION OF THE ISOTOPES OF THE PRIMARY COSMIC RAYS BETWEEN BERYLLIUM AND IRON (Z FROM 4 TO 26) AND THE ELEMENTAL ABUNDANCES UP TO TIN (Z=50). CERENKOV COUNTERS AND HODOSCOPES WILL BE COUPLED WITH THE EARTH'S MAGNETIC FIELD TO BE USED AS A SPECTROMETER. THEY WILL DETERMINE CHARGE AND MASS OF COSMIC RAYS TO A PRECISION OF 10 PERCENT FOR THE MOST ABUNDANT ELEMENTS OVER THE MOMENTUM RANGE FROM 2 TO 25 GEV/C.

***** HELIOS-A *****

SPACECRAFT COMMON NAME- HELIOS-A
ALTERNATE NAMES- HELIO-A, PL-741A
NSSDC ID- HELIO-A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 12/10/74 SPACECRAFT WEIGHT- 210. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN-CENT

SPONSORING COUNTRY/AGENCY
FED REP OF GERMANY DMW
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC
ORBIT PERIOD- 192. DAY INCLINATION- 0. DEG
PERIAPSIS- 0.3 AU APOAPSIS- 0.3 AU

SPACECRAFT PERSONNEL (PI=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PI - A. KUTZERGFS FUR WELTRAUMFORSCH BONN, FED REP OF GERMANY
PI - G.W. DUSLENASA-GSFC GREENBELT, MD
PS - H. PRORG FOR SPACE RES MUNICH, FED REP OF GERMANY
PS - J.H. TRAUBNASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE HELIOS-A SPACECRAFT IS DESIGNED AS A SOLAR PROBE TO CARRY SCIENTIFIC EXPERIMENTS ON AN INTERPLANETARY MISSION APPROACHING TO ABOUT 0.3 AU OF THE SUN. THE EXPERIMENTS WILL BE PROVIDED BY A GROUP OF GERMAN AND AMERICAN SCIENTISTS, WITH NASA SUPPLYING THE TITAN CENTAUR LAUNCH VEHICLE AND THE FEDERAL REPUBLIC OF GERMANY SUPPLYING THE SPACECRAFT.

----- HELIOS-A. FECHTIG -----

EXPERIMENT NAME- MICROMETEOROID DETECTOR AND ANALYZER

NSSDC ID- HELIOS-A-12

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - H. FECHTIGMPI-NUCLEAR PHYS HEIDELBERG, FED REP OF GERMANY
DI - J. WEINRAUCHMPI HEIDELBERG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION

THE AIM OF THE EXPERIMENT WILL BE TO INVESTIGATE SOME THEORIES ABOUT THE INTERPLANETARY DUST INCLUDING WHETHER -- (1) THE NUMBER OF PARTICLES INCREASES TOWARD THE SUN, (2) THE CUT-OFF FOR SMALL PARTICLES IS DEPENDENT ON THE DISTANCE FROM THE SUN BECAUSE SOLAR PRESSURE INCREASES NEARER THE SUN, AND (3) THE NUMBER DENSITIES OF PARTICLES CHANGE NEAR THE ORBITS OF PLANETS. THE KINETIC ENERGY OF DUST PARTICLES HITTING A TARGET WITH HIGH VELOCITY (SEVERAL KM/SEC) WILL CAUSE THE MATERIAL TO VAPORIZE AND BECOME PARTIALLY IONIZED. THE

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

GENERATED PLASMA CLOUD CAN THEN BE SEPARATED BY APPROPRIATE VOLTAGES INTO ITS NEGATIVE (ELECTRON) PART AND INTO POSITIVE IONS. THE MASS AND THE ENERGY OF THE DUST PARTICLES WILL BE DETERMINED FROM THE IMPULSE HEIGHTS. A TIME-OF-FLIGHT MASS SPECTROMETER IN CONNECTION WITH THE TARGET WILL ALLOW THE SMALL ION CLOUD TO BE ANALYZED. IN THIS WAY THE INVESTIGATION OF THE CHEMICAL COMPOSITION OF THE DUST PARTICLES WILL BECOME POSSIBLE. THE THRESHOLD FOR THE DETECTION OF A PARTICLE WILL BE ABOUT 10 TO THE MINUS 15 GM. MASS AND ENERGY DETERMINATION WILL BE POSSIBLE FOR PARTICLES LARGER THAN ABOUT 10 TO THE MINUS 14 GM. FOR PARTICLES LARGER THAN 10 TO THE MINUS 13 GM, A MASS SPECTRUM MAY BE GATHERED.

----- HELIOS-A, GURNETT -----

EXPERIMENT NAME- COARSE FREQUENCY, FINE TIME RESOLUTION
SPECTRUM ANALYSIS

NSSDC ID- HELIO-A-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - P.S. KELLOGGU OF MINNESOTA
MINNEAPOLIS, MN
OI - S.J. BAUERNASA-GSFC
GREENBELT, MD
OI - R.G. STONENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTATIC AND ELECTROMAGNETIC WAVE PHENOMENA OVER THE FREQUENCY RANGE FROM 10 HZ TO 2 MHZ IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TO-TIP LENGTH OF AT LEAST FIVE TIMES THE SPACECRAFT DIAMETER. THREE SPECTRUM ANALYZERS WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIO-A-04, HELIO-A-05, AND HELIO-A-06) WILL BE USED. THE ANALYZER IN EXPERIMENT HELIO-A-04 WILL BE A 16-CHANNEL SPECTRUM ANALYZER FOR COARSE FREQUENCY RESOLUTION (30 PERCENT) AND HIGH TIME RESOLUTION (1/16 SEC) OVER THE FREQUENCY RANGE FROM 10 HZ TO 100 KHZ.

----- HELIOS-A, GURNETT -----

EXPERIMENT NAME- FINE FREQUENCY, COARSE TIME RESOLUTION
SPECTRUM ANALYSIS

NSSDC ID- HELIO-A-05

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - P.S. KELLOGGU OF MINNESOTA
MINNEAPOLIS, MN
OI - S.J. BAUERNASA-GSFC
GREENBELT, MD
OI - R.G. STONENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTATIC AND ELECTROMAGNETIC WAVE PHENOMENA OVER THE FREQUENCY RANGE FROM 10 HZ TO 2 MHZ IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TO-TIP LENGTH OF AT LEAST FIVE TIMES THE SPACECRAFT DIAMETER. THREE SPECTRUM ANALYZERS WILL BE USED WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIO-A-04, HELIO-A-05, AND HELIO-A-06). THE ANALYZER FOR HELIO-A-05 WILL BE A NARROW-BAND SWEEP FREQUENCY SPECTRUM ANALYZER FOR FINE FREQUENCY RESOLUTION (4 PERCENT) AND LOW TIME RESOLUTION (LESS THAN 1 MIN) OVER THE FREQUENCY RANGE FROM 10 HZ TO 100 KHZ.

----- HELIOS-A, GURNETT -----

EXPERIMENT NAME- 50-KHZ TO 2-MHZ RADIO WAVE

NSSDC ID- HELIO-A-06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - P.S. KELLOGGU OF MINNESOTA
MINNEAPOLIS, MN
OI - S.J. BAUERNASA-GSFC
GREENBELT, MD
OI - R.G. STONENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF A DUAL STEP-FREQUENCY RADIOMETER (5 KHZ BANDWIDTH), OPERATING BETWEEN 50 KHZ AND 2 MHZ IN A VARIABLE NUMBER OF STEPS. THE RADIOMETER WILL BE COUPLED TO A DIPOLE ANTENNA SHARED WITH TWO OTHER SPECTRUM

ANALYZERS, WHICH WILL COVER THE 10 HZ TO 100 KHZ SPECTRAL RANGE. THE PURPOSE OF THIS EXPERIMENT WILL BE TO STUDY TYPE III SOLAR RADIO BURSTS.

----- HELIOS-A, KEPPLER -----

EXPERIMENT NAME- ENERGETIC ELECTRON DETECTOR

NSSDC ID- HELIO-A-10

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - E. KEPPLERMPI-AERONOMY
LINDAU, FED REP OF GERMANY
OI - G. WILKENMPI-AERONOMY
LINDAU, FED REP OF GERMANY
OI - D.J. WILLIAMSNOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
ELECTRONS WITH ENERGIES BETWEEN 40 KEV AND 1 MEV WILL BE ENERGY-SELECTED BY TWO PERMANENT MAGNETS AND COUNTED BY SEMICONDUCTOR DETECTORS. PROTONS WILL BE DEFLECTED AND COUNTED SEPARATELY. THE POINTING DIRECTION WILL BE WITHIN THE ECLIPTIC PLANE WITH AN APERTURE ANGLE OF ABOUT 20 DEG. THE TIME RESOLUTION WILL BE ON THE ORDER OF MINUTES.

----- HELIOS-A, KUNDT -----

EXPERIMENT NAME- CELESTIAL MECHANICS

NSSDC ID- HELIO-A-14

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W. KUNDTU OF HAMBURG
HAMBURG, FED REP OF GERMANY
OI - W.G. MELBOURNENASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL USE THE TRACKING DATA TO OBTAIN A DETAILED SPACECRAFT ORBIT AND IMPROVED KNOWLEDGE OF THE ORBITAL ELEMENTS OF THE EARTH-MOON SYSTEM AND GENERAL RELATIVITY PARAMETERS.

----- HELIOS-A, KUNOW -----

EXPERIMENT NAME- COSMIC-RAY PARTICLES

NSSDC ID- HELIO-A-07

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H. KUNOWU OF KIEL
KIEL, FED REP OF GERMANY
OI - G. WIGBERGERU OF KIEL
KIEL, FED REP OF GERMANY
OI - G. GREENU OF KIEL
KIEL, FED REP OF GERMANY
OI - H. MUELLER-MELLINU OF KIEL
KIEL, FED REP OF GERMANY
OI - H. WITTEU OF KIEL
KIEL, FED REP OF GERMANY
OI - H. HEMPEU OF KIEL
KIEL, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MEASURE SOLAR AND GALACTIC PROTON, ELECTRON, AND ALPHA-PARTICLE FLUXES, SPECTRA, AND DIRECTIONAL CHARACTERISTICS AS FUNCTIONS OF DISTANCE FROM THE SUN. THE INSTRUMENTATION TO BE USED WILL CONSIST OF FIVE SEMICONDUCTOR DETECTORS AND A SAPPHIRE CERENKOV DETECTOR ENCLOSED BY AN ANTICINCIDENCE CYLINDER. THE EXPERIMENT WILL BE CAPABLE OF DETECTING PARTICLES FROM 1 TO 1000 MEV/NUCLEON. THE MEASUREMENTS WILL BE CORRELATED WITH THOSE FROM AN IDENTICAL DETECTOR ON HELIOS-B, WITH THOSE FROM OTHER HELIOS-A EXPERIMENTS, AND WITH DATA FROM SATELLITES IN EARTH ORBIT.

----- HELIOS-A, LEINERT -----

EXPERIMENT NAME- ZOOIACAL LIGHT PHOTOMETER

NSSDC ID- HELIO-A-11

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C. LEINERTLAND ORS
HEIDELBERG, FED REP OF GERMANY
OI - E. PITZLAND ORS
HEIDELBERG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF THREE PHOTOMETERS LOOKING AT 15 DEG, 30 DEG, AND 90 DEG FROM THE ECLIPTIC. THESE

PHOTOMETERS WILL OBSERVE THE INTENSITY AND POLARIZATION OF THE ZODIACAL LIGHT IN UV, BLUE, AND VISUAL BANDS. THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBTAIN INFORMATION ABOUT THE SPATIAL DISTRIBUTION, SIZE, AND NATURE OF INTERPLANETARY DUST PARTICLES.

----- HELIOS-A, NESS -----

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR AVERAGE FIELDS

NSSDC ID- HELIO-A-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - N.F. NESSNASA-GSFC
GREENBELT, MD
OI - F. MARIANIU OF AQUILA
AQUILA, ITALY
OI - L.F. BURLAGANASA-GSFC
GREENBELT, MD
OI - S.C. CANTARANOU OF ROME
ROME, ITALY

EXPERIMENT BRIEF DESCRIPTION
A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE INTERPLANETARY MAGNETIC FIELD DIRECTIONS AND MAGNITUDES IN THE FOLLOWING THREE RANGES (AND ACCURACIES) -- 25 GAMMAS (0.1 GAMMA), 75 GAMMAS (0.3 GAMMA), 225 GAMMAS (0.9 GAMMA). AT LOW TELEMETRY BIT RATES, AVERAGES AND VARIANCES WILL BE COMPUTED ONBOARD FOR TRANSMISSION TO EARTH.

----- HELIOS-A, NEUBAUER -----

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR FIELD FLUCTUATIONS

NSSDC ID- HELIO-A-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.M. NEUBAUERBRAUNSCHWEIG TECH U
BRAUNSCHWEIG, FED REP OF GERMANY
OI - A. MATERBRAUNSCHWEIG TECH U
BRAUNSCHWEIG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE VECTOR COMPONENTS OF THE MAGNETIC FIELD WITH MAGNITUDE UP TO 100.4 GAMMAS (RESOLUTION 0.4 GAMMA) AND WITH MAGNITUDES UP TO 400.6 GAMMAS (RESOLUTION 1.2 GAMMA). ONE VECTOR MEASUREMENT PER 2 SEC WILL BE OBTAINED IN THE NORMAL MODE. EIGHT MEASUREMENTS PER SEC WILL BE OBTAINED IN THE SHOCK MODE TO BE USED FOR INTERVALS OF ABOUT 1 MIN. THUS, THE QUASI-STATIC COMPONENT AND FLUCTUATING COMPONENTS OF THE INTERPLANETARY MAGNETIC FIELD WILL BE STUDIED.

----- HELIOS-A, NEUBAUER -----

EXPERIMENT NAME- SEARCH COIL MAGNETOMETER

NSSDC ID- HELIO-A-03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.M. NEUBAUERBRAUNSCHWEIG TECH U
BRAUNSCHWEIG, FED REP OF GERMANY
OI - U. DEHMELBRAUNSCHWEIG TECH U
BRAUNSCHWEIG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
MAGNETIC FLUCTUATIONS IN THE FREQUENCY RANGE 5 HZ TO 3 KHZ WILL BE MEASURED BY A TRIAXIAL SEARCH-COIL MAGNETOMETER. FOR THE AXIS PARALLEL TO THE SPACECRAFT SPIN AXIS, SPECTRAL RESOLUTION WILL BE OBTAINED. BECAUSE OF THE LOW DATA RATE AVAILABLE, SHORT-TERM HIGH-RESOLUTION DATA ON EVENTS (SHOCKS) WILL BE ACCOMPLISHED USING ONBOARD DATA STORAGE.

----- HELIOS-A, ROSENHAUER -----

EXPERIMENT NAME- PLASMA DETECTORS

NSSDC ID- HELIO-A-09

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.R. ROSENHAUERMPI-EXTRATERR PHYS
GARCHING, FED REP OF GERMANY
OI - H. PELLKOPFMPI
GARCHING, FED REP OF GERMANY
OI - J.M. WOLFFNASA-APC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION
THREE THIN DETECTORS WILL BE USED TO STUDY THE DIRECTIONAL INTENSITY OF THE PROTONS, ALPHA PARTICLES, AND ELECTRONS IN THE SOLAR WIND. A QUADRISPHERICAL ANALYZER WITH

AN ENERGY PER CHARGE RANGE OF 231 V TO 16 KV, AN ANGULAR RESOLUTION OF 5 DEG IN AZIMUTH AND 5 DEG IN ELEVATION, AND A TIME RESOLUTION OF 30 SEC WILL BE USED TO OBSERVE PROTONS AND ALPHA PARTICLES. A HEMISPHERICAL ANALYZER WILL ALSO BE USED TO DETECT PROTONS AND ALPHA PARTICLES. ANOTHER HEMISPHERICAL ANALYZER WITH 10 ENERGY/CHARGE STEPS BETWEEN 16 V AND 1 KV, WILL BE USED TO OBSERVE ELECTRONS. MEASUREMENTS WILL BE MADE IN EIGHT EQUAL AZIMUTHAL SECTORS (45 DEG). THE INTEGRATION ANGLE IN ELEVATION WILL BE ABOUT 100 DEG.

----- HELIOS-A, TRAINOR -----

EXPERIMENT NAME- GALACTIC AND SOLAR COSMIC RAYS

NSSDC ID- HELIO-A-00

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. TRAINORNASA-GSFC
GREENBELT, MD
OI - E.C. ROELOFAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - B.J. TEEGARDENNASA-GSFC
GREENBELT, MD
OI - F.B. MC DONALDNASA-GSFC
GREENBELT, MD
OI - K.G. MCCrackenU OF ADELAIDE
ADELAIDE, AUSTRALIA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF THREE PARTICLE TELESCOPES DESIGNED TO MEASURE THE ENTIRE ENERGY RANGE OF 0.1 TO ABOUT 800 MEV FOR PROTONS AND HEAVIER PARTICLES (2 LESS THAN 10) AND OF 0.05 TO 5 MEV FOR ELECTRONS. ENERGY SPECTRA, AND CHEMICAL AND ISOTOPIC COMPOSITION OF GALACTIC AND SOLAR COSMIC RAYS WILL BE STUDIED. ADDITIONALLY, AN X-RAY COUNTER WILL MONITOR THE SOLAR X-RAY EMISSION. THE THREE TELESCOPES WILL BE CONSTRUCTED FROM SOLID-STATE DETECTORS. THE TELESCOPES AND THE X-RAY COUNTER WILL LOOK INTO THE ECLIPTIC PLANE.

***** HELIOS-B *****

SPACECRAFT COMMON NAME- HELIOS-B

ALTERNATE NAMES- HELIO-B, PL-751A

NSSDC ID- HELIO-B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- JAN. 76 SPACECRAFT WEIGHT- 210. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN-CENT

SPONSORING COUNTRY/AGENCY
FED REP OF GERMANY BMWF
UNITED STATES NASA-GSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC
ORBIT PERIOD- 192. DAYS
PERIAPSIS- 0.3 AU RAD INCLINATION- 0. DEG
APOAPSIS- 0.3 AU RAD

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - A. KUTZERGES FUR WELTRAUMFORSCH
BONN, FED REP OF GERMANY
PM - G.W. DUSLEYNASA-GSFC
GREENBELT, MD
PS - H. PORSCHEDRC FOR SPACE RES
MUNICH, FED REP OF GERMANY
PS - J.H. TRAINORNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE HELIOS-B SPACECRAFT IS DESIGNED AS A SOLAR PROBE TO CARRY SCIENTIFIC EXPERIMENTS ON AN INTERPLANETARY MISSION APPROACHING TO ABOUT 0.3 AU OF THE SUN. THE EXPERIMENTS WILL BE PROVIDED BY A GROUP OF GERMAN AND U.S. SCIENTISTS, WITH NASA SUPPLYING THE TITAN CENTAUR LAUNCH VEHICLE AND THE FEDERAL REPUBLIC OF GERMANY SUPPLYING THE SPACECRAFT.

----- HELIOS-B, FECHTIG -----

EXPERIMENT NAME- MICROMETEOROID DETECTOR AND ANALYZER

NSSDC ID- HELIO-B-12

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H. FECHTIGMPI-NUCLEAR PHYS
HEIDELBERG, FED REP OF GERMANY
OI - J. WEINRAUCHMPI
HEIDELBERG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
THE AIM OF THE EXPERIMENT WILL BE TO INVESTIGATE SOME THENRIES ABOUT THE INTERPLANETARY DUST INCLUDING WHETHER -- (1) THE NUMBER OF PARTICLES INCREASES TOWARD THE SUN, (2) THE CUT-OFF FOR SMALL PARTICLES IS DEPENDENT ON THE DISTANCE FROM THE SUN BECAUSE SOLAR PRESSURE INCREASES NEARER THE SUN, AND (3) THE NUMBER DENSITIES OF PARTICLES CHANGE NEAR THE ORBITS OF PLANETS. THE KINETIC ENERGY OF DUST PARTICLES HITTING A TARGET WITH HIGH VELOCITY (SEVERAL KM/SEC) WILL CAUSE THE

MATERIAL TO VAPORIZE AND BECOME PARTIALLY IONIZED. THE GENERATED PLASMA CLOUD CAN THEN BE SEPARATED BY APPROPRIATE VOLTAGES INTO ITS NEGATIVE (ELECTRON) PART AND INTO POSITIVE IONS. FROM THE IMPULSE HEIGHTS, THE MASS AND THE ENERGY OF THE DUST PARTICLES WILL BE DETERMINED. A TIME-OF-FLIGHT MASS SPECTROMETER IN CONNECTION WITH THE TARGET WILL ALLOW THE SMALL ION CLOUD TO BE ANALYZED. IN THIS WAY THE INVESTIGATION OF THE CHEMICAL COMPOSITION OF THE DUST PARTICLES WILL BECOME POSSIBLE. THE THRESHOLD FOR THE DETECTION OF A PARTICLE WILL BE ABOUT 10 TO THE MINUS 15 GM. MASS AND ENERGY DETERMINATION WILL BE POSSIBLE FOR PARTICLES LARGER THAN ABOUT 10 TO THE MINUS 14 GM. FOR PARTICLES LARGER THAN 10 TO THE MINUS 13 GM, A MASS SPECTRUM MAY BE GATHERED.

----- HELIOS-B, GURNETT -----

EXPERIMENT NAME- COARSE FREQUENCY, FINE TIME RESOLUTION SPECTRUM ANALYSIS

NSDDC ID- HELIO-B-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - P.S. KELLOGGU OF MINNESOTA
MINNEAPOLIS, MN
OI - S.J. BAUERNASA-GSFC
GREENBELT, MD
OI - R.G. STONENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTATIC AND ELECTROMAGNETIC WAVE PHENOMENA OVER THE FREQUENCY RANGE FROM 10 KHZ TO 2 MHZ IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TO-TIP LENGTH OF AT LEAST FIVE TIMES THE SPACECRAFT DIAMETER. THREE SPECTRUM ANALYZERS WILL BE USED WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIO-B-04, HELIO-B-05, AND HELIO-B-06). THE ANALYZER IN EXPERIMENT HELIO-B-04 WILL BE A 16-CHANNEL SPECTRUM ANALYZER FOR COARSE FREQUENCY RESOLUTION (30 PERCENT) AND HIGH TIME RESOLUTION (LT. 1 SECOND) OVER THE FREQUENCY RANGE FROM 10 KHZ TO 100 KHZ.

----- HELIOS-B, GURNETT -----

EXPERIMENT NAME- FINE FREQUENCY, COARSE TIME RESOLUTION SPECTRUM ANALYSIS

NSDDC ID- HELIO-B-05

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - P.S. KELLOGGU OF MINNESOTA
MINNEAPOLIS, MN
OI - S.J. BAUERNASA-GSFC
GREENBELT, MD
OI - R.G. STONENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE TO OBSERVE ELECTROSTATIC AND ELECTROMAGNETIC WAVE PHENOMENA OVER THE FREQUENCY RANGE FROM 10 KHZ TO 2 MHZ IN INTERPLANETARY SPACE BETWEEN 1 AND 0.3 AU. THE ANTENNA FOR THIS EXPERIMENT WILL CONSIST OF AN ELECTRIC DIPOLE WITH A TIP-TO-TIP LENGTH OF AT LEAST FIVE TIMES THE SPACECRAFT DIAMETER. THREE SPECTRUM ANALYZERS WILL BE USED WHICH JOINTLY COVER THE FREQUENCY RANGE OF INTEREST (HELIO-B-04, HELIO-B-05, AND HELIO-B-06). THE ANALYZER FOR HELIO-B-05 WILL BE A NARROW-BAND SWEEP FREQUENCY SPECTRUM ANALYZER FOR FINE FREQUENCY RESOLUTION (4 PERCENT) AND LOW TIME RESOLUTION (ABOUT 1 MINUTE) OVER THE FREQUENCY RANGE FROM 10 KHZ TO 100 KHZ.

----- HELIOS-B, GURNETT -----

EXPERIMENT NAME- 50-KHZ TO 2-MHZ RADIO WAVE

NSDDC ID- HELIO-B-06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - P.S. KELLOGGU OF MINNESOTA
MINNEAPOLIS, MN
OI - S.J. BAUERNASA-GSFC
GREENBELT, MD
OI - R.G. STONENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT WILL CONSIST OF A DUAL STEP-FREQUENCY RADIO METER (5 KHZ BANDWIDTH), OPERATING BETWEEN 50 KHZ AND 2

MHZ IN A VARIABLE NUMBER OF STEPS. THE RADIO METER WILL BE COUPLED TO A DIPOLE ANTENNA SHARED WITH TWO OTHER SPECTRUM ANALYZERS WHICH WILL COVER THE 10-KHZ TO 100-KHZ SPECTRAL RANGE. THE PURPOSE OF THE EXPERIMENT WILL BE TO STUDY TYPE III SOLAR RADIO BURSTS.

----- HELIOS-B, KEPPLER -----

EXPERIMENT NAME- ENERGETIC ELECTRON DETECTOR

NSDDC ID- HELIO-B-10

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - E. KEPPLERMPI-AERONOMY
LINDAU, FED REP OF GERMANY
OI - O. WILKENMPI-AERONOMY
LINDAU, FED REP OF GERMANY
OI - D.J. WILLIAMSNDAA-PRL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

ELECTRONS WITH ENERGIES BETWEEN 40 KEV AND 1 MEV WILL BE ENERGY SELECTED BY TWO PERMANENT MAGNETS AND COUNTED BY SEMICONDUCTOR DETECTORS. PROTONS WILL BE DEFLECTED AND COUNTED SEPARATELY. THE POINTING DIRECTION WILL BE WITHIN THE ECLIPTIC PLANE WITH AN APERTURE ANGLE OF ABOUT 20 DEG. THE TIME RESOLUTION WILL BE ON THE ORDER OF MINUTES.

----- HELIOS-3, KUNDT -----

EXPERIMENT NAME- CELESTIAL MECHANICS

NSDDC ID- HELIO-B-14

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W. KUNDTU OF HAMBURG
HAMBURG, FED REP GER
OI - W.G. MELBOURNENASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE THE TRACKING DATA TO OBTAIN A DETAILED SPACECRAFT ORBIT AND IMPROVED KNOWLEDGE OF THE ORBITAL ELEMENTS OF THE EARTH-MOON SYSTEM AND GENERAL RELATIVITY PARAMETERS.

----- HELIOS-D, KUNDW -----

EXPERIMENT NAME- COSMIC-RAY PARTICLES

NSDDC ID- HELIO-B-07

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H. KUNDWU OF KIEL
KIEL, FED REP OF GERMANY
OI - G. WIRGERENZU OF KIEL
KIEL, FED REP OF GERMANY
OI - G. GREENU OF KIEL
KIEL, FED REP OF GERMANY
OI - H. MUELLER-MELLINU OF KIEL
KIEL, FED REP OF GERMANY
OI - H. WITTEU OF KIEL
KIEL, FED REP OF GERMANY
OI - H. HEMPEU OF KIEL
KIEL, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE SOLAR AND GALACTIC, PROTON, ELECTRON, AND ALPHA-PARTICLE FLUXES, SPECTRA, AND DIRECTIONAL CHARACTERISTICS AS FUNCTIONS OF DISTANCE FROM THE SUN. THE INSTRUMENTATION TO BE USED WILL CONSIST OF FIVE SEMICONDUCTOR DETECTORS AND A SAPPHIRE CERENKOV DETECTOR ENCLOSED BY AN ANTICINCIDENCE CYLINDER. THE EXPERIMENT WILL BE CAPABLE OF DETECTING PARTICLES FROM 1 TO 1000 MEV/NUCLEON. THE MEASUREMENTS WILL BE CORRELATED WITH THOSE FROM AN IDENTICAL DETECTOR ON HELIOS-A, WITH THOSE FROM OTHER HELIOS-B EXPERIMENTS, AND WITH DATA FROM SATELLITES IN EARTH ORBIT.

----- HELIOS-B, LEINERT -----

EXPERIMENT NAME- ZODIACAL LIGHT PHOTOMETER

NSDDC ID- HELIO-B-11

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C. LEINERTLAND DGS
HEIDELBERG, FED REP OF GERMANY
OI - E. PITZLAND DGS
HEIDELBERG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PHOTOMETERS LOOKING AT 15 DEG, 30 DEG, AND 90 DEG FROM THE ECLIPTIC. THESE PHOTOMETERS WILL OBSERVE THE INTENSITY AND POLARIZATION OF THE ZODIACAL LIGHT IN WHITE LIGHT AND IN UV, BLUE, AND VISUAL BANDS. THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBTAIN INFORMATION ABOUT THE SPATIAL DISTRIBUTION, SIZE, AND NATURE OF INTERPLANETARY DUST PARTICLES.

----- HELIOS-D, NESS -----

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR AVERAGE FIELDS

NSDDC ID- HELIO-D-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - N.F. NESSNASA-GSFC
GREENBELT, MD
OI - F. MARIANIU OF AQUILA
AQUILA, ITALY
OI - L.F. RUPLAGANASA-GSFC
GREENBELT, MD
OI - S.C. CANTARANOU OF ROME
ROME, ITALY

EXPERIMENT BRIEF DESCRIPTION
A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE INTERPLANETARY MAGNETIC FIELD DIRECTIONS, AND MAGNITUDES IN THE FOLLOWING THREE RANGES (AND ACCURACIES) -- 25 GAMMAS (0.1 GAMMA), 75 GAMMAS (0.3 GAMMA), 225 GAMMAS (0.9 GAMMA). AT LOW TELEMETRY HIT RATES, AVERAGES AND VARIANCES WILL BE COMPUTED ONBOARD FOR TRANSMISSION TO EARTH.

----- HELIOS-H, NEUBAUER -----

EXPERIMENT NAME- FLUXGATE MAGNETOMETER FOR FIELD FLUCTUATIONS

NSDDC ID- HELIO-D-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.M. NEUBAUERBRAUNSCHWEIG TECH U
BRAUNSCHWEIG, FED REP OF GERMANY
OI - A. MAIERBRAUNSCHWEIG TECH U
BRAUNSCHWEIG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
A TRIAXIAL FLUXGATE MAGNETOMETER WILL MEASURE VECTOR COMPONENTS OF THE MAGNETIC FIELD WITH MAGNITUDE UP TO 102.4 GAMMAS (RESOLUTION 0.4 GAMMA) AND WITH MAGNITUDES UP TO 409.6 GAMMAS (RESOLUTION 1.2 GAMMA). ONE VECTOR MEASUREMENT PER 2 SEC WILL BE OBTAINED IN THE NORMAL MODE. EIGHT MEASUREMENTS PER SEC WILL BE OBTAINED IN THE SHOCK MODE TO BE USED FOR INTERVALS OF ABOUT 3 MIN. THUS, THE QUASI-STATIC COMPONENT AND FLUCTUATING COMPONENTS OF THE INTERPLANETARY MAGNETIC FIELD WILL BE STUDIED.

----- HELIOS-B, NEUBAUER -----

EXPERIMENT NAME- SEARCH COIL MAGNETOMETER

NSDDC ID- HELIO-B-03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.M. NEUBAUERBRAUNSCHWEIG TECH U
BRAUNSCHWEIG, FED REP OF GERMANY
OI - G. DEHMELBRAUNSCHWEIG TECH U
BRAUNSCHWEIG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
MAGNETIC FLUCTUATIONS IN THE FREQUENCY RANGE 5 HZ TO 3 KHZ WILL BE MEASURED BY A TRIAXIAL SEARCH-COIL MAGNETOMETER. FOR THE AXIS PARALLEL TO THE SPACECRAFT SPIN AXIS, SPECTRAL RESOLUTION WILL BE OBTAINED. BECAUSE OF THE LOW DATA RATE AVAILABLE, SHORT-TERM HIGH-RESOLUTION DATA ON EVENTS (SHOCKS) WILL BE OBTAINED USING ONBOARD DATA STORAGE.

----- HELIOS-H, ROSENBAUER -----

EXPERIMENT NAME- PLASMA DETECTORS

NSDDC ID- HELIO-H-09

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.R. ROSENBAUERMPI-EXT/ATM PHYS
GARCHING, FED REP OF GERMANY
OI - H. PELLKOPELMPI
GARCHING, FED REP OF GERMANY
OI - J.H. WOLFENASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THESE THREE DETECTORS WILL BE USED TO STUDY THE DIRECTIONAL INTENSITY OF THE PROTONS, ALPHA PARTICLES, AND ELECTRONS IN THE SOLAR WIND. A QUADRISPHERICAL ANALYZER WITH AN ENERGY PER CHARGE RANGE OF 231 V TO 16 KV, AN ANGULAR RESOLUTION OF 5 DEG IN AZIMUTH AND 5 DEG IN ELEVATION, AND A TIME RESOLUTION OF 30 SEC WILL BE USED TO OBSERVE PROTONS AND ALPHA PARTICLES. A HEMISPHERICAL ANALYZER WILL ALSO BE USED TO DETECT PROTONS AND ALPHA PARTICLES. ANOTHER HEMISPHERICAL ANALYZER WITH 10 ENERGY/CHARGE STEPS BETWEEN 16 V AND 1 KV, WILL BE USED TO OBSERVE ELECTRONS. MEASUREMENTS WILL BE MADE IN EIGHT EQUAL AZIMUTHAL SECTORS (45 DEG). THE INTEGRATION ANGLE IN ELEVATION WILL BE ABOUT 100 DEG.

----- HELIOS-B, TRAINOR -----

EXPERIMENT NAME- GALACTIC AND SOLAR COSMIC RAYS

NSDDC ID- HELIO-B-08

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. TRAINORNASA-GSFC
GREENBELT, MD
OI - E.C. ROELOFAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - B.J. TAYGARDENNASA-GSFC
GREENBELT, MD
OI - F.B. McDONALDNASA-GSFC
GREENBELT, MD
OI - K.G. MCCrackenU OF ADELAIDE
ADELAIDE, AUSTRALIA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF THREE PARTICLE TELESCOPES DESIGNED TO MEASURE THE ENTIRE ENERGY RANGE OF 0.1 TO ABOUT 600 MEV FOR PROTONS AND HEAVIER PARTICLES (2 LESS THAN 10) AND OF 0.05 TO 5 MEV FOR ELECTRONS. ENERGY SPECTRA, AND CHEMICAL AND ISOTOPIIC COMPOSITION OF GALACTIC AND SOLAR COSMIC RAYS WILL BE STUDIED. ADDITIONALLY, AN X-RAY COUNTER WILL MONITOR THE SOLAR X-RAY EMISSION. THE THREE TELESCOPES WILL BE CONSTRUCTED FROM SOLID-STATE DETECTORS. THE TELESCOPES AND THE X-RAY COUNTER WILL LOOK INTO THE ECLIPTIC PLANE.

***** HELOS *****

SPACECRAFT COMMON NAME- HELOS
ALTERNATE NAMES- HIGHLY ECCENTRIC LUN OCCULT. SAT., EXOSAT
EUROPEAN X-RAY QDS SAT.

NSDDC ID- HELOS

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- 08/00/79 SPACECRAFT WEIGHT- KG
LAUNCH SITE-
LAUNCH VEHICLE-

SPONSORING COUNTRY/AGENCY
INTERNATIONAL ESRO

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN
PERIAPSIS- KM ALT INCLINATION- 60.0 DEG
APOAPSIS- 200000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN

PS - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION
THE OBJECTIVES OF THIS MISSION WILL BE THE MEASUREMENT OF THE POSITION, STRUCTURAL FEATURES, SPECTRAL, AND TEMPORAL CHARACTERISTICS OF COSMIC X-RAY SOURCES. THE POSITION AND DIAMETER OF COSMIC X-RAY SOURCES WILL BE DETERMINED BY THE OBSERVATION OF THE TIME AND SPEED WITH WHICH THE SOURCES DISAPPEAR BEHIND THE MOON DURING LUNAR OCCULTATIONS. THE ABILITY TO CORRECT BOTH THE ORBIT AND THE ORIENTATION OF THE SPACECRAFT, COUPLED WITH THE HIGHLY-ECCENTRIC ORBIT, WILL ENABLE THE SPACECRAFT TO OBSERVE ANY PORTION OF THE SKY FOR LONG PERIODS OF TIME. TEMPORAL VARIATIONS ON SCALES RANGING FROM TENS OF MICROSECONDS TO TENS OF HOURS WILL BE OBSERVABLE, AS WELL AS ENERGY SPECTRUM OBSERVATIONS AND ABSOLUTE FLUX MEASUREMENTS OF OBJECTS WITH AN INTENSITY GREATER THAN 5 TIMES 10 TO THE -5 THAT OF THE CRAB NEBULA. BRIGHT SOURCES WILL BE LOCATABLE TO WITHIN ARC-SEC IN POSITION.

----- HELOS, UNKNOWN -----

EXPERIMENT NAME- MEDIUM-ENERGY COSMIC X-RAY PACKAGE

NSDDC ID- HELOS -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - UNKNOWNUNKNOWN

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, WHICH WILL OBSERVE COSMIC X-RAY SOURCES IN THE ENERGY RANGE OF 1.5 TO 20 KEV, WILL CONSIST OF PROPORTIONAL COUNTERS LOCATED BEHIND MODIFIED HONEYCOMB COLLIMATORS.

----- HELOS, UNKNOWN -----

EXPERIMENT NAME- LOW-ENERGY COSMIC X-RAY PACKAGE

NSSDC ID- HELOS -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN*****

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, WHICH WILL OBSERVE COSMIC X-RAY SOURCES IN THE 0.1- TO 2-KEV RANGE, WILL UTILIZE THIN-WINDOW, POSITION-SENSITIVE PROPORTIONAL COUNTERS LOCATED BEHIND GRAZING-INCIDENCE MIRRORS.

*****HELOS 1 *****

SPACECRAFT COMMON NAME- HELOS 1
ALTERNATE NAMES- HELOS-A1, HELOS-A
03595
NSSDC ID- 68-109A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/00/72.

LAUNCH DATE- 12/05/68 SPACECRAFT WEIGHT- 105, KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
INTERNATIONAL ESPD

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 12/24/69
ORBIT PERIOD- 8690, MIN INCLINATION- 28.1 DEG
PERIAPSIS- 6804, KM ALT APDAPSIS- 227099, KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 12/04/70
ORBIT PERIOD- 8704.6 MIN INCLINATION- 61.782 DEG
PERIAPSIS- 27505, KM ALT APDAPSIS- 200098, KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J. VANDENKERCKHOVEESRO-ESTEC
NOORDWIJK, NETHERLANDS
PS - B.G. TAYLORESRO-ESTEC
NOORDWIJK, NETHERLANDS

SPACECRAFT BRIEF DESCRIPTION

HELOS 1 WAS AN EARTH ORBITING, SPIN-STABILIZED SATELLITE THAT WAS LAUNCHED BY ESRO. IT WAS BASICALLY CYLINDRICAL WITH AN AXIAL BOOM SUPPORTING THE ANTENNA AND THE MAGNETOMETERS. THE SPIN AXIS ATTITUDE AND SPIN RATE WERE CHANGED BY ONBOARD GAS JETS. THE SPACECRAFT OBJECTIVES WERE TO STUDY THE INTERPLANETARY MAGNETIC FIELDS, COSMIC RAYS, SOLAR WIND, AND THE MAGNETOSHEATH. THE SPACECRAFT OPERATION WAS FULLY SATISFACTORY FOR 16 MONTHS, AFTER WHICH INTERMITTENT LOSS OF SOME SOLAR GATE (ATTITUDE REFERENCE) PULSES OCCURRED, BY 1974. SPACECRAFT TELEMETRY COVERAGE WAS 50 PERCENT, AND ONLY THE MAGNETIC FIELD EXPERIMENT WAS OPERATIONAL. THE SPACECRAFT IS EXPECTED TO REENTER THE EARTH'S ATMOSPHERE IN OCTOBER 1975.

----- HELOS 1, ELLIOT -----

EXPERIMENT NAME- INTERPLANETARY MAGNETIC FIELDS

NSSDC ID- 68-109A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/00/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - H. ELLIOTIMPERIAL COLLEGE
LONDON, ENGLAND
OI - P.C. HEDGECOCKIMPERIAL COLLEGE
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE MAGNETIC FIELDS IN THE RANGE PLUS TO MINUS 66 GAMMAS WITH AN ACCURACY OF 0.25 GAMMA USING A ROOM-MOUNTED TRIAXIAL FLUXGATE MAGNETOMETER. THE HELOS-1 SPACECRAFT WAS LAUNCHED INTO A HIGHLY ECCENTRIC ORBIT SO THAT THE MAGNETOMETER MEASURED MAGNETIC FIELDS WITHIN THE MAGNETOSPHERE AND THE TRANSITION AND INTERPLANETARY REGIONS. THE MAGNETOMETER OPERATED CONTINUOUSLY IN TWO MODES. ONE GAVE A CONTINUOUS SERIES OF VECTORS SAMPLED AT 48 SEC INTERVALS. THE OTHER OPERATED VIA A 16 KILOBIT DATA STORE WITH A VARIETY OF MEASUREMENT PROGRAMS WITH OPTIONS INCLUDING COMMAND OR AUTOMATIC REPLAY, SHOCK TYPE EVENT DETECTION, ETC. THE EXPERIMENT OPERATION WAS NORMAL AS OF OCTOBER 1974, EXCEPT THAT MEASUREMENTS WERE MISSING WHEN SOLAR GATE PULSES WERE MISSING.

*****IMP-H *****

SPACECRAFT COMMON NAME- IMP-H
ALTERNATE NAMES- PL-711A, EXPLORER 47
IMP 7, 06197
NSSDC ID- 72-073A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/23/72.

LAUNCH DATE- 09/23/72 SPACECRAFT WEIGHT- 390, KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 09/25/72
ORBIT PERIOD- 17305, MIN INCLINATION- 28.6 DEG
PERIAPSIS- 201599, KM ALT APDAPSIS- 235639, KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 07/13/74
ORBIT PERIOD- 17482, MIN INCLINATION- 9.215 DEG
PERIAPSIS- 198770, KM ALT APDAPSIS- 243626, KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - P. BUTLERNASA-GSFC
GREENBELT, MD
PS - J.H. KINGNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
IMP-H CONTINUED THE STUDY BEGUN BY EARLIER IMP SPACECRAFT OF THE INTERPLANETARY AND MAGNETOTAIL REGIONS FROM A NEARLY CIRCULAR ORBIT, NEAR 37 EARTH RADII. THIS 16-SIDED DRUM-SHAPED SPACECRAFT WAS 157 CM HIGH AND 135 CM IN DIAM. IT WAS DESIGNED TO MEASURE ENERGETIC PARTICLES, PLASMA, AND ELECTRIC AND MAGNETIC FIELDS. THE SPIN AXIS WAS NORMAL TO THE ECLIPTIC PLANE, AND THE SPIN PERIOD WAS 1.3 SEC. THE SPACECRAFT WAS POWERED BY SOLAR CELLS AND A CHEMICAL BATTERY. SCIENTIFIC DATA WERE TELEMETTERED TO EARTH AT 1600 BPS (WITH A SECONDARY 400-BPS RATE AVAILABLE).

----- IMP-H, NAME -----

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA

NSSDC ID- 72-073A-10

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 09/23/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S.J. BAMELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.R. ASBRIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

A HEMISPHERICAL ELECTROSTATIC ANALYZER WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, MAGNETOSHEATH, AND MAGNETOTAIL. IONS AS HEAVY AS OXYGEN WERE RESOLVED WHEN THE SOLAR WIND TEMPERATURE WAS LOW. ENERGY ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. IN THE SOLAR WIND, POSITIVE IONS FROM 200 EV TO 5 KEV (15 PERCENT SPACING, 3 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) WERE STUDIED. IN THE MAGNETOSHEATH, POSITIVE IONS FROM 200 EV TO 4 KEV (15 PERCENT SPACING, 3 PERCENT RESOLUTION) AND FROM 200 EV TO 2 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) WERE STUDIED. IN THE MAGNETOTAIL, POSITIVE IONS FROM 200 EV TO 20 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND FROM 100 EV TO 20 KEV (15 PERCENT RESOLUTION) WERE STUDIED.

----- IMP-H, BRIDGE -----

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA

NSSDC ID- 72-073A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 12/11/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - M.S. BRIDGEMASS INST OF TECH
CAMBRIDGE, MA
OI - A.J. LAZARUSMASS INST OF TECH
CAMBRIDGE, MA
OI - J.H. GINSACKMASS INST OF TECH
CAMBRIDGE, MA
OI - E.F. LYONMASS INST OF TECH
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

A MODULATED SPLIT-COLLECTOR FARADAY CUP WHICH WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, TRANSITION REGION, AND MAGNETOTAIL. ELECTRONS WERE STUDIED IN EIGHT LOGARITHMICALLY EQUISPACED CHANNELS

BETWEEN 17 KEV AND 7 KEV. POSITIVE IONS WERE STUDIED IN EIGHT CHANNELS BETWEEN 50 KEV AND 7 KEV. A SPECTRUM WAS OBTAINED EVERY EIGHT SPACECRAFT REVOLUTIONS. ANGULAR INFORMATION WAS OBTAINED IN EITHER 15 EQUALLY SPACED INTERVALS DURING A 360-DEG REVOLUTION OF THE SATELLITE OR IN 15 ANGULAR SEGMENTS CENTERED MORE CLOSELY ABOUT THE SPACECRAFT SUN LINE.

----- IMP-H, CLINE -----

EXPERIMENT NAME- STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS

NSSDC ID- 72-073A-11

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 10/13/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, DI=OTHER INVESTIGATOR, TH=TEAM MEMBER)
PI - T.L. CLINENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT STUDIED GALACTIC AND SOLAR ELECTRONS AND POSITRONS IN THE KINETIC ENERGY RANGE 50 KEV TO 2 MEV. INFORMATION ON PROTONS BETWEEN 0.5 AND 4.0 MEV WAS ALSO OBTAINED. A COLLIMATED STILBENE CRYSTAL SCINTILLATOR LOOKING PERPENDICULAR TO THE SPACECRAFT SPIN AXIS SERVED AS THE PRINCIPAL DETECTOR. A SIMILAR, FULLY SHIELDED CRYSTAL SERVED TO DETERMINE THE CONTRIBUTION TO THE PRINCIPAL DETECTOR COUNT RATE OF ELECTRONS AND PROTONS GENERATED WITHIN THE PRINCIPAL DETECTOR BY GAMMA RAYS AND NEUTRONS, RESPECTIVELY. A FULLY SHIELDED CsI CRYSTAL SERVED AS A GAMMA-RAY SPECTROMETER AND WAS USED IN COINCIDENCE WITH THE PRINCIPAL DETECTOR TO DISTINGUISH ELECTRONS FROM POSITRONS. COUNT RATES FROM EACH DETECTOR OBTAINED IN EIGHT ANGULAR SECTORS PER REVOLUTION WERE TELEMETRED. IN ADDITION, THE AMPLITUDE AND SHAPE OF THE PULSE GENERATED IN THE PRINCIPAL DETECTOR BY THE FIRST STOPPING PARTICLE IN EACH APPROPRIATE TELEMETRY FRAME WILL BE STUDIED. PULSE AMPLITUDE AND SHAPE WERE TO YIELD ENERGY (10 PERCENT RESOLUTION) AND PARTICLE SPECIES INFORMATION.

----- IMP-H, FRANK -----

EXPERIMENT NAME- MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS

NSSDC ID- 72-073A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 09/23/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, DI=OTHER INVESTIGATOR, TH=TEAM MEMBER)
PI - L.A. FRANKU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT MEASURED THE ENERGY SPECTRA OF LOW-ENERGY ELECTRONS AND PROTONS IN THE GEOCENTRIC RANGE 30 TO 40 R/L TO FURTHER UNDERSTAND GEOMAGNETIC STORMS, AURORA, TAIL AND NEUTRAL SHEET, AND OTHER MAGNETOSPHERIC PHENOMENA. THE DETECTOR WAS A DUAL-CHANNEL CURVED PLATE ELECTROSTATIC ANALYZER (LEPDEA - LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ANALYZER) WITH 16 ENERGY INTERVALS BETWEEN 5 EV AND 50 KEV. IT HAD AN ANGULAR FIELD OF VIEW OF 9 DEG X 25 DEG IN FOUR DIRECTIONS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. THE DETECTOR WAS OPERATED IN ONE OF TWO MODES (1) ONE PROVIDING GOOD ANGULAR RESOLUTION (16 DIRECTIONS FOR EACH PARTICLE ENERGY BAND) ONCE EACH 272 SEC, AND (2) ONE PROVIDING GOOD TEMPORAL RESOLUTION IN WHICH THE ENTIRE ENERGY RANGE IN FOUR DIRECTIONS WAS MEASURED EVERY 68 SEC.

----- IMP-H, GLOCKLER -----

EXPERIMENT NAME- IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV

NSSDC ID- 72-073A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 11/25/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, DI=OTHER INVESTIGATOR, TH=TEAM MEMBER)
PI - G. GLOCKLERU OF MARYLAND
COLLEGE PARK, MD

DI - C.V. JIANU OF ARIZONA
TUCSON, AZ
DI - D.K. HOFSTADTMPI
GARCHING, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO DETERMINE THE COMPOSITION AND ENERGY SPECTRA OF LOW-ENERGY PARTICLES ASSOCIATED WITH SOLAR ACTIVITY. THE DETECTORS USED WERE (1) AN ELECTROSTATIC ANALYZER (TO SELECT PARTICLES OF THE DESIGNATED ENERGY PER CHARGE) COMBINED WITH AN ARRAY OF WINDOWLESS SOLID-STATE DETECTORS (TO MEASURE THE ENERGY LOSS) AND SURROUNDED BY AN ANTICINCIDENCE SHIELDING AND (2) A PARTICLE TELESCOPE CONSISTING OF A SILICON SURFACE BARRIER DETECTOR AND A FLAT TWO-CHANNEL PROPORTIONAL COUNTER ENCLOSED IN AN ANTICINCIDENCE SCINTILLATOR CUP. THE EXPERIMENT MEASURED PARTICLE ENERGIES FROM 0.1 TO 2 MEV PER CHARGE IN 12 BANDS AND UNBIAIY IDENTIFIED POSITRONS AND ELECTRONS AS WELL AS NUCLEI WITH CHARGES 0, 2 FROM 1 TO 8 (NO CHARGE RESOLUTION FOR Z GREATER THAN 4). TWO 1000-CHANNEL PULSE HEIGHT ANALYZERS, ONE

FOR EACH ELEMENT OF THE TELESCOPE, WERE INCLUDED IN THE EXPERIMENT PAYLOAD. THE TELESCOPE FAILED ON NOVEMBER 25, 1972 WHEN THE WINDOW ON THE PROPORTIONAL COUNTER WEAKENED AND BURST DUE TO EXPOSURE TO UV RADIATION.

----- IMP-H, KRIMIGIS -----

EXPERIMENT NAME- CHARGED PARTICLE MEASUREMENTS EXPERIMENT

NSSDC ID- 72-073A-08

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 12/11/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, DI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - S.H. KRIMIGISAPPLIED PHYSICS LAB
SILVER SPRING, MD
DI - T.P. ARMSTRONGU OF KANSAS
LAWRENCE, KS
DI - J.A. VAN ALLENU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THREE SOLID-STATE DETECTORS IN AN ANTICINCIDENCE PLASTIC SCINTILLATOR OBSERVED ELECTRONS BETWEEN 0.2 AND 2.5 MEV, PROTONS BETWEEN 0.3 AND 500 MEV, ALPHA PARTICLES BETWEEN 2.0 AND 200 MEV, HEAVY PARTICLES WITH ATOMIC NUMBERS RANGING FROM 2 TO 5 WITH ENERGIES GREATER THAN 0 MEV, HEAVY PARTICLES WITH Z VALUES RANGING BETWEEN 6 AND 8 WITH ENERGIES GREATER THAN 32 MEV, AND INTEGRAL PROTONS AND ALPHAS OF ENERGIES GREATER THAN 50 MEV/NUCLEON, ALL WITH DYNAMIC RANGES OF 1 TO ONE HILLION (PER SQUARE CM-SEC-STER). FIVE THIN WINDOW GEIGER-MULLER TUBES OBSERVED ELECTRONS OF ENERGY GREATER THAN 15 KEV, PROTONS OF ENERGY GREATER THAN 250 KEV, AND X RAYS WITH WAVELENGTHS BETWEEN 2 AND 10 A. ALL WITH A DYNAMIC RANGE OF 10 TO 100 MILLION (PER SQUARE CM-SEC-STER). PARTICLES AND X RAYS PRIMARILY OF SOLAR ORIGIN WERE STUDIED, BUT THE DYNAMIC RANGE AND RESOLUTION OF THE INSTRUMENT PERMITTED COSMIC RAYS AND MAGNETOTAIL PARTICLES TO BE OBSERVED.

----- IMP-H, MC DONALD -----

EXPERIMENT NAME- SOLAR AND COSMIC-RAY PARTICLES

NSSDC ID- 72-073A-09

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 09/26/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, DI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - F.B. MC DONALDNASA-GSFC
GREENBELT, MD
DI - D.F. HAGGENASA-JSC
HOUSTON, TX
DI - D.J. TEEGARDENNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE GSFC COSMIC-RAY EXPERIMENT MEASURED ENERGY SPECTRA, COMPOSITION, AND ANGULAR DISTRIBUTION OF SOLAR AND GALACTIC ELECTRONS, PROTONS, AND HEAVIER NUCLEI UP TO Z = 30. THREE DISTINCT DETECTOR SYSTEMS WERE USED. THE FIRST SYSTEM CONSISTED OF A PAIR OF SOLID-STATE TELESCOPES WHICH MEASURED INTEGRAL FLUXES ABOVE 150, 350, AND 700 KEV AND OF PROTONS ABOVE 0.05, 0.15, 0.70, 1.0, 1.2, 2.0, 2.5, 5.0, 15, AND 25 MEV, EXCEPT FOR THE .05 MEV PROTON MODE, ALL COUNTING MODES HAD UNIQUE SPECIES IDENTIFICATION. THE SECOND DETECTOR SYSTEM WAS A SOLID-STATE DE/DX VS R TELESCOPE THAT LOOKED PERPENDICULAR TO THE SPIN AXIS. THIS TELESCOPE MEASURED NUCLEI FROM 1 TO 16 AMU WITH ENERGIES BETWEEN 4 AND 20 MEV/NUCLEON. COUNTS OF PARTICLES IN THE 0.5 TO 4 MEV/NUCLEON RANGE, WITH NO CHARGE RESOLUTION, WERE OBTAINED AS COUNTS IN THE DE/DX, BUT NOT IN THE E, SENSOR. THE THIRD DETECTOR SYSTEM WAS A THREE-ELEMENT CsI SCINTILLATOR TELESCOPE WHOSE AXIS MADE AN ANGLE OF 39 DEG WITH RESPECT TO THE SPIN AXIS. THE INSTRUMENT RESPONDED TO ELECTRONS BETWEEN 2 AND 12 MEV AND NUCLEI FROM 1 TO 30 AMU IN THE ENERGY RANGE 20 TO 500 MEV/NUCLEON. FOR PARTICLES BELOW 80 MEV, THIS INSTRUMENT ACTED AS A DE/DX DETECTOR. ABOVE 80 MEV, IT ACTED AS A DIRECTIONAL TRIPLE DE/DX DETECTOR. FLUX DIRECTIONALITY INFORMATION WAS OBTAINED BY DIVIDING CERTAIN PORTIONS OF THE DATA FROM EACH DETECTOR SYSTEM INTO EIGHT ANGULAR SECTORS.

----- IMP-H, OGILVIE -----

EXPERIMENT NAME- SOLAR WIND ION COMPOSITION

NSSDC ID- 72-073A-12

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 09/26/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, DI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - K.W. OGILVIENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

AN ELECTROSTATIC ANALYZER AND WFN-TYPE VELOCITY SELECTOR WERE USED TO GAIN EXPLORATORY DATA ON HEAVY ION COMPOSITION IN THE SOLAR WIND. THE PULK VELOCITIES OF H⁺, HE⁺, JHE⁺, AND O (ISOTOPES INDISTINGUISHABLE) IONS IN ALL IONIZATION STATES WERE SEPARATELY STUDIED. DURING 30 SUCCESSIVE SPACECRAFT SPIN PERIODS, IONS OF A GIVEN SPECIES WERE STUDIED IN 30 LOGARITHMICALLY EQUISPACED BULK VELOCITY

CHANNELS FROM 200 TO 600 KM/SEC. A COMPLETE SET OF MEASUREMENTS REQUIRED ABOUT 10 MIN AND CONSISTED OF THIRTY 1-STEP SEQUENCES FOR 4 HE+ IONS AND FIVE 10-STEP SEQUENCES FOR EACH OF THE OTHER THREE SPECIES.

----- IMP-H, SCARF -----

EXPERIMENT NAME- PLASMA WAVE EXPERIMENT

NSSDC ID- 72-073A-11

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 09/24/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.L. SCARFTSM SYSTEMS GROUP
REDDOND BEACH, CA
OI - G.H. CROOKTSM SYSTEMS GROUP
REDDOND BEACH, CA
OI - L.W. GREENTSM SYSTEMS GROUP
REDDOND BEACH, CA
OI - R.W. FREDERICKSTSM SYSTEMS GROUP
REDDOND BEACH, CA

EXPERIMENT BRIEF DESCRIPTION
ELECTRIC FIELD COMPONENTS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS AND THE MAGNETIC FIELD COMPONENT PARALLEL TO THAT AXIS WERE MEASURED BY AN ELECTRIC DIPOLE ANTENNA AND A SEARCH COIL MAGNETOMETER. BOTH SENSORS WERE MOUNTED ON A 3.05-M 803M. DATA WERE OBTAINED IN EIGHT FREQUENCY CHANNELS FROM 10 HZ TO 100 KHZ IN EITHER THE NORMAL MODE OR THE SNAPSHOT MODE. TWO CHANNELS, CENTERED AT 67 AND 600 HZ, HAD 10-DB FALL-OFF POINTS OF 17 AND 150 HZ, AND 270 AND 510 HZ, RESPECTIVELY. THE REMAINING SIX CHANNELS WERE NARROW-BANDWIDTH CHANNELS CENTERED AT 1.3, 2.3, 5.4, 10.5, 30, AND 70 KHZ. IN THE NORMAL MODE, THE ANTENNA WAS FIRST SAMPLED IN A GIVEN FREQUENCY CHANNEL MANY TIMES DURING A GIVEN MEASUREMENT PERIOD (COMPARABLE TO THE SPACECRAFT SPIN PERIOD). DURING THE NEXT PERIOD, THE SEARCH COIL WAS SAMPLED MANY TIMES IN THE SAME FREQUENCY CHANNEL. NEXT, THE ANTENNA WAS SAMPLED IN THE NEXT FREQUENCY CHANNEL, FOLLOWED BY THE SEARCH COIL IN THAT CHANNEL. THE FREQUENCY CHANNELS WERE INCREMENTED, AND THE SAMPLED SENSORS WERE ALTERNATED UNTIL A FULL SET OF DATA WAS OBTAINED IN 16 MEASUREMENT PERIODS (APPROXIMATELY 20 SEC). IN THE SNAPSHOT MODE, ONLY ELECTRIC FIELD DATA WERE TRANSMITTED. AS FOLLOWS, THE ANTENNA WAS FIRST SAMPLED IN A GIVEN FREQUENCY CHANNEL MANY TIMES DURING A GIVEN MEASUREMENT PERIOD. IN THE NEXT PERIOD, THE ANTENNA WAS SAMPLED IN TWO SEQUENCES OF EIGHT FREQUENCY CHANNELS. THIS TWO-PERIOD MEASUREMENT WAS EXECUTED EIGHT TIMES, EACH TIME INCREMENTING THE FREQUENCY CHANNEL STUDIED IN EVERY OTHER PERIOD BY ONE. THUS, A FULL SET OF DATA AGAIN REQUIRED 16 MEASUREMENT PERIODS. IN ADDITION, AN ANALOG MODE, SAMPLING THE ANTENNA AND SEARCH COIL FROM 10 TO 100 HZ, WAS USED IN CONJUNCTION WITH THE SPECIAL PURPOSE ANALOG TELEMETRY TEST TO BE CONDUCTED. UNFORTUNATELY THIS NEW TELEMETRY SYSTEM DID NOT WORK WELL, AND LITTLE IF ANY USABLE DATA WERE OBTAINED IN THIS MODE OF OPERATION. FOR THE DIGITAL MODES, THE ELECTRIC AND MAGNETIC THRESHOLDS WERE SET BY INTERFERENCE CAUSED BY THE SOLAR CELL ARRAYS. THIS INTERFERENCE WAS DUE TO THE ASYMMETRIC SHEATH RELATED TO THE NON-CONDUCTING SATELLITE SURFACE AND THE SIX-SIDED GEOMETRY OF THE SPACECRAFT PANELS. IT IS EXPECTED THAT THESE INTERFERENCE PROBLEMS WILL ADVERSELY AFFECT MOST AMBIENT FIELD MEASUREMENTS.

----- IMP-H, SIMPSON -----

EXPERIMENT NAME- SOLAR FLARE HIGH- γ /LOW-E AND LOW-Z ISOTOPE EXPERIMENT

NSSDC ID- 72-073A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 09/23/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.A. SIMPSONU OF CHICAGO
CHICAGO, IL
OI - M. GARCIA-MUNOZU OF CHICAGO
CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS TO INCREASE THE UNDERSTANDING OF SOLAR FLARE PARTICLE ACCELERATION AND PARTICLE CONTAINMENT IN MAGNETIC FIELDS IN THE VICINITY OF THE SUN. THE DETECTOR POINTED ALONG THE SPACECRAFT SPIN AXIS. IT WAS A WINDOWLESS DE/UX VS E TELESCOPE WITH ANTICINCIDENCE SHIELDING AND OPERATED IN EITHER OF TWO MODES -- (1) THE HIGH Z - LOW E MODE HAVING AN ENERGY RANGE 0.5 TO 50 MEV/NUCLEON AND A CHARGE RANGE $z=5$ TO 50 AND (2) THE LOW Z MODE, HAVING AN ENERGY RANGE 6 TO 1200 MEV/NUCLEON (ISOTOPES - HYDROGEN, DEUTERIUM, TRITIUM, HELIUM-3, HELIUM-4). THE ENERGY RANGE FOR ELECTRONS WAS PRIMARILY 0.3 TO 10 MEV. THE ACCEPTANCE ANGLE OF THE DETECTOR WAS 50-DEG FULL ANGLE.

----- IMP-H, STONE -----

EXPERIMENT NAME- ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES

NSSDC ID- 72-073A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 09/23/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - E.C. STONECALIF INST OF TECH
PASADENA, CA
OI - R.E. VOGTCALIF INST OF TECH
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT STUDIED (VIA DIFFERENTIAL ENERGY SPECTRA) LOCAL ACCELERATION OF PARTICLES, ACCELERATION PROCESSES OF SOLAR PARTICLES, STORAGE IN THE INTERPLANETARY MEDIUM, AND SOLAR MODULATION OF PARTICLES IN THE INTERPLANETARY MEDIUM. THE DETECTOR USED WAS A MULTI-ELEMENT, TOTALLY DEPLETED SOLID-STATE TELESCOPE WITH ANTICINCIDENCE SHIELDING AND WAS OPERATED IN ANY OF THREE MODES -- (1) THE ENERGY RANGE MODE, (2) THE ELECTRON MODE (150 KEV TO 2.8 MEV), AND (3) THE HYDROGEN AND HELIUM ISOTOPES MODE (0.5 TO 40 MEV/NUCLEON). THE DETECTOR HAD AN ANGULAR RESOLUTION OF PLUS TO MINUS 22 DEG.

----- IMP-H, WILLIAMS -----

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS

NSSDC ID- 72-071A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 09/26/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.J. WILLIAMSNDAA-EOL
BOULDER, CO
OI - C.D. ROSTROMAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - J.C. ARMSTRONGAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - J.H. TRAINORNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSES OF THIS EXPERIMENT WERE (1) TO STUDY THE PROPAGATION CHARACTERISTICS OF SOLAR COSMIC RAYS THROUGH THE INTERPLANETARY MEDIUM OVER THE ENERGY RANGES INDICATED BELOW, (2) TO STUDY ELECTRON AND PROTON PATCHES THROUGHOUT THE GEOMAGNETIC TAIL AND NEAR AND THROUGH THE FLANKS OF THE MAGNETOPAUSE, AND (3) TO STUDY THE ENTRY OF SOLAR COSMIC RAYS INTO THE GEOMAGNETIC FIELD. THE INSTRUMENTATION CONSISTED OF A THREE-ELEMENT TELESCOPE CONFIGURATION EMPLOYING SOLID-STATE DETECTORS AND A MAGNET TO DEFLECT ELECTRONS. TWO SIDE-MOUNTED DETECTORS WERE USED TO DETECT THE ELECTRONS DEFLECTED BY THE MAGNET. TWO ADDITIONAL SOLID-STATE DETECTORS WERE USED TO DETECT VERY LOW-ENERGY (GREATER THAN 15 KEV) PARTICLES, ALPHA PARTICLES, AND CHARGED PARTICLES OF z GREATER THAN 2. THE EXPERIMENT WAS DESIGNED TO MEASURE (1) PROTON FLUXES FROM 30 KEV TO GREATER THAN 8.6 MEV IN SIX RANGES, (2) ELECTRON FLUXES FROM 30 KEV TO GREATER THAN 450 KEV IN THREE RANGES, (3) CHARGED PARTICLES GREATER THAN 15 KEV, (4) ALPHA PARTICLES GREATER THAN 0.5 MEV, GREATER THAN 1.6 MEV, 2.2 TO 8.8 MEV, AND 8.8 TO 35 MEV, AND (5) CHARGED PARTICLES OF z GREATER THAN 2 AT E GREATER THAN 5 MEV.

***** [IMP-I] *****

SPACECRAFT COMMON NAME- IMP-I

ALTERNATE NAMES- EXPLORER 43, IMP 6
05043

NSSDC ID- 71-019A

LAST REPORTED STATE- LAUNCHED AND OPERATING *****
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

LAUNCH DATE- 07/13/71 SPACECRAFT WEIGHT- 675 KG
LAUNCH SITE- CAPE CANAVERAL, UNITED ST
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-F

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 9566
PERIAPSIS- 353,000 K EPOCH DATE- 03/17/71
INCLINATION- 28.80 DEG
APAPSIS- 204577. KM ALT

RECENT ORBIT PARAMETER
ORBIT TYPE- GEO
ORBIT PERIOD- 9566
PERIAPSIS- 353,000 K EPOCH DATE- 09/05/73
INCLINATION- 37.714 DEG
APAPSIS- 195513. KM ALT

SPACECRAFT PI- MEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - P. BLUMNASA-GSFC
GREENBELT, MD
PS - P.D. McDONALDNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

IMP-I CONTINUED THE STUDY, BEGUN BY EARLIER IMPS, OF THE INTERPLANETARY AND OUTER MAGNETOSPHERIC REGIONS BY MEASURING ENERGETIC PARTICLES, PLASMA, AND ELECTRIC AND MAGNETIC FIELDS. A RADIO ASTRONOMY EXPERIMENT WAS ALSO INCLUDED IN THE SPACECRAFT PAYLOAD. THE 16-SIDED SPACECRAFT WAS 182.12 CM HIGH BY 135.44 CM IN DIAMETER. THE SPACECRAFT SPIN AXIS WAS NORMAL TO THE ECLIPTIC PLANE, AND ITS SPIN RATE WAS 5 RPM. THE INITIAL APPOGE POINT LAY NEAR THE EARTH-SUN LINE. THE

SOLAR-CELL AND CHEMICAL-BATTERY-POWERED SPACECRAFT CARRIED TWO TRANSMITTERS. ONE CONTINUOUSLY TRANSMITTED PCM ENCODER DATA AT A 1000-OPS INFORMATION BIT RATE. THE SECOND TRANSMITTER WAS USED FOR TRANSMISSION OF VLF DATA AND FOR RANGING INFORMATION. THREE ORTHOGONAL PAIRS OF DIPOLE ANTENNAS WERE USED FOR THE ELECTRIC FIELD EXPERIMENTS, AND ONE OF THESE PAIRS WAS ALSO USED FOR THE RADIO ASTRONOMY EXPERIMENT. THE MEMBERS OF THE ANTENNA PAIR ALONG THE SPACECRAFT SPIN AXIS EXTENDED 2.9 M; THE MEMBERS OF THE PAIR USED IN BOTH THE ELECTRIC FIELD AND RADIO ASTRONOMY EXPERIMENTS EXTENDED 45.5 M, AND THE MEMBERS OF THE THIRD PAIR WERE SLIGHTLY UNBALANCED, EXTENDING 24.4 AND 27.6 M, RESPECTIVELY. ALL FOUR ELEMENTS PERPENDICULAR TO THE SPIN AXIS WENT TO HAVE EXTENDED 45.5 M. THE SPACECRAFT REENTERED THE EARTH'S ATMOSPHERE OCTOBER 2, 1974, AFTER A HIGHLY SUCCESSFUL MISSION.

----- IMP-1, AGGSON -----

EXPERIMENT NAME- ELECTROSTATIC FIELDS

NSSDC ID- 71-019A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING ****3****
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.L. AGGSON NASA-GSFC

OI - J.P. HOPPER GREENWALT, MD

OI - J.P. HOPPER NASA-GSFC

OI - J.P. HOPPER GREENWALT, MD

EXPERIMENT BRIEF DESCRIPTION

TWO DIPOLE ANTENNAS WERE MOUNTED ORTHOGONALLY IN THE SPIN PLANE OF THE SPACECRAFT WHILE A THIRD DIPOLE ANTENNA WAS MOUNTED ALONG THE SPACECRAFT SPIN AXIS. ANTENNA ELEMENT LENGTHS WERE -X, 27.6 M; -Y, 24.4 M; -Z AND +Y, 45.5 M; -Z AND +X (SPIN AXIS), 2.9 M. ELECTROMETERS MEASURED THE ANALOG POTENTIAL DIFFERENCE BETWEEN THE ELEMENTS IN EACH PAIR OF ANTENNAS SIMULTANEOUSLY EVERY 0.12 SEC. THE POTENTIAL DIFFERENCES WERE SAMPLED DIGITALLY THROUGH A 14-BIT ANALOG/DIGITAL CONVERTER EVERY 0.64 SEC. THE SENSITIVITY WAS 100 MICROVOLTS PER METON.

----- IMP-1, ANDERSON -----

EXPERIMENT NAME- MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS

NSSDC ID- 71-019A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING ****3****
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

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OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

OI - K.A. ANDERSON U OF CALIF, BERKELEY

EXPERIMENT BRIEF DESCRIPTION

A HEMISPHERICAL ELECTROSTATIC ANALYZER WAS USED TO EXTEND DESCRIPTIONS OF THE PARTICLE (ELECTRON AND POSITIVE ION) POPULATIONS IN THE SOLAR WIND, MAGNETOSHEATH, AND MAGNETOTAIL. ENERGY SPECTRAL ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. THE ANALYZER HAD FOUR COMMANDABLE MODES. THE FIRST MODE WAS DESIGNED FOR THE MEASUREMENT OF SOLAR WIND PROTONS AND ALPHA PARTICLES. DURING EIGHT SPACECRAFT REVOLUTIONS, 32-LEVEL ENERGY SPECTRA WERE OBTAINED IN EIGHT ANGULAR RANGES CENTERED ON THE SUN. THE ENERGY LEVELS EXTENDED FROM 100 EV TO 8 KEV. THE SECOND MODE WAS DESIGNED FOR THE MEASUREMENT OF SOLAR WIND HEAVY IONS. THIS CYCLE WAS THE SAME AS THE FIRST EXCEPT THAT THE ENERGY PER CHARGE LEVELS WERE LIMITED TO 900 V TO 8 KV, AND THE EFFICIENCY OF COUNTING HEAVY IONS WAS INCREASED RELATIVE TO PROTONS AND ALPHA PARTICLES. THE THIRD MODE WAS DESIGNED FOR THE MEASUREMENT OF SOLAR WIND AND MAGNETOSHEATH ELECTRONS AND MAGNETOTAIL POSITIVE IONS. THIS WAS A COMBINATION CYCLE IN WHICH ELECTRON AND POSITIVE ION SPECTRA WERE ALTERNATED. DURING A CYCLE OF NINE SPACECRAFT REVOLUTIONS, EIGHT ELECTRON SPECTRA AND EIGHT POSITIVE ION SPECTRA WERE OBTAINED. THE COMBINED DATA FOR ELECTRONS IN THIS MODE CONSISTED OF 10-LEVEL ENERGY SPECTRA TAKEN IN 32 EVENLY SPACED ANGULAR RANGES. THE SPECTRA EXTENDED FROM 4 TO 1000 EV. THE DATA FOR POSITIVE IONS CONSISTED OF 32-LEVEL SPECTRA TAKEN IN THE SAME 32 ANGULAR RANGES. THE ENERGY PER CHARGE SPECTRA EXTENDED FROM 100 V TO 8 KV. THE FOURTH MODE WAS DESIGNED FOR MAGNETOTAIL ELECTRONS AND POSITIVE IONS. ELECTRONS AND POSITIVE IONS WERE STUDIED WITH 16-LEVEL SPECTRA IN 32 EVENLY SPACED ANGULAR RANGES FOR BOTH ELECTRONS AND POSITIVE IONS. THE ENERGY PER CHARGE RANGES WERE 6 V TO 24 KV FOR ELECTRONS AND 45 V TO 36 KV FOR POSITIVE IONS.

----- IMP-1, BOSTROM -----

EXPERIMENT NAME- MONITORING OF SOLAR PROTONS

NSSDC ID- 71-019A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING ****3****
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.O. BOSTROM APPLIED PHYSICS LAB

OI - D.J. WILLIAMS NOAA-ERL

OI - D.J. WILLIAMS BOULDER, CO

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

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OI - D.S. BEALL SILVER SPRING, MD

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OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

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OI - D.S. BEALL SILVER SPRING, MD

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OI - D.S. BEALL APPLIED PHYSICS LAB

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OI - D.S. BEALL SILVER SPRING, MD

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OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

OI - D.S. BEALL APPLIED PHYSICS LAB

OI - D.S. BEALL SILVER SPRING, MD

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

KEY AND TO PROVIDE BACKGROUND MEASUREMENTS FOR THE LEPDEA. ONE CONTINUOUS CHANNEL ELECTRON MULTIPLIER FAILED ON AUGUST 10, 1974, SO THAT NO USEFUL ELECTRON DATA WERE COLLECTED FOR THE LAST 7 WEEKS OF THE SPACECRAFT LIFE. OTHERWISE, THE EXPERIMENT FUNCTIONED NORMALLY OVER THE SPACECRAFT LIFETIME.

----- IMP-1, GURNETT -----

EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE -- IOWA

NSSDC ID- 71-019A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING *****
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - P.S. KELLOGGU OF MINNESOTA
MINNEAPOLIS, MN
OI - T.L. AGGSONNASA-GSFC
GREENBELT, MD
OI - J.P. HEPPNERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THREE ORTHOGONAL SEARCH COILS AND THE THREE ORTHOGONAL NEARLY BALANCED DIPOLES USED IN THE DC ELECTRIC FIELD EXPERIMENT (71-019A-02) GAINED SIMULTANEOUS E AND B FIELD DATA IN 16 LOGARITHMICALLY EQUISPACED NARROW CHANNELS FROM 20 HZ TO 200 KHZ. THE SPECTRAL FREQUENCY RESOLUTION WAS ABOUT 30 PERCENT. EACH E-B CHANNEL WAS SAMPLED EVERY 5.12 SEC. A SHORT BACK-UP DIPOLE ANTENNA (ABOUT 1/4 TIP TO TIP) WAS ALSO USED TO DETECT VERY SHORT WAVELENGTH PLASMA PHENOMENA. ANALOG B OR E DATA FROM 0 TO 30 KHZ IN THREE SEGMENTS WERE ALSO TELEMETTERED ON THE SPECIAL PURPOSE 4-W ANALOG CHANNEL. THIS EXPERIMENT WAS DESIGNED TO BE USED IN CONJUNCTION WITH THE LOW-ENERGY PHOTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPDEA).

----- IMP-1, GURNETT -----

EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE -- GSFC

NSSDC ID- 71-019A-16

LAST REPORTED STATE- LAUNCHED AND OPERATING *****
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - T.L. AGGSONNASA-GSFC
GREENBELT, MD
OI - J.P. HEPPNERNASA-GSFC
GREENBELT, MD
OI - P.S. KELLOGGU OF MINNESOTA
MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION
AC ELECTRIC FIELD INTENSITY IN 12 NARROW CHANNELS WAS MEASURED FROM 0.1 TO 100 HZ. THE EXPERIMENT HAD AN OPTIMUM NOISE THRESHOLD OF 10 MICROVOLTS PER METER. EACH CHANNEL WAS SAMPLED ONCE EVERY 5.12 SEC AT THE HIGH DUTY RATE. THE ANTENNAS USED IN THE DC FIELD EXPERIMENT (71-019A-02) WERE ALSO UTILIZED IN THIS EXPERIMENT.

----- IMP-1, MADDOCK -----

EXPERIMENT NAME- INTERPLANETARY LONG-WAVELENGTH RADIO ASTRONOMY EXPERIMENT

NSSDC ID- 71-019A-13

LAST REPORTED STATE- LAUNCHED AND OPERATING *****
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.T. MADDOCKU OF MICHIGAN
ANN ARBOR, MI
OI - W.C. ERICKSONU OF MARYLAND
COLLEGE PARK, MD
OI - R.G. STONENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE OBJECTIVE OF THIS EXPERIMENT WAS TO STUDY THE SPECTRA OF THE GALAXY, THE SUN, AND JUPITER WITH HIGH FLUX RESOLUTION (ABOUT 1 PERCENT). A RADIO METER, OPERATING IN EITHER A STEPPING MODE (EIGHT FREQUENCIES) OR AT A SINGLE FREQUENCY, WAS CONNECTED TO A 300-FT DIPOLE ANTENNA, WHICH WAS ALSO USED IN THE ELECTRIC FIELD EXPERIMENTS. THE FREQUENCY RANGE COVERED WAS 0.05 TO 3.5 KHZ.

----- IMP-1, KELLOGG -----

EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE -- MINN

NSSDC ID- 71-019A-12

LAST REPORTED STATE- LAUNCHED AND OPERATING *****
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P.S. KELLOGGU OF MINNESOTA
MINNEAPOLIS, MN
OI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - T.L. AGGSONNASA-GSFC
GREENBELT, MD
OI - J.P. HEPPNERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO DETERMINE THE POLARIZATION, DIRECTION OF PROPAGATION, POINTING FLUX, AND DIRECTION OF THE WAVE NORMAL SURFACE FOR PLASMA WAVES. THE TIME-AVERAGED CORRELATION AT ONE CHANNEL FREQUENCY FROM ANY COMBINATION OF THE SIX ANTENNA ELEMENTS (THREE EACH ORTHOGONAL E AND B) COULD BE SIMULTANEOUSLY CALCULATED BY SIX ONBOARD ANALOG COMPUTERS. THERE WERE SIX LOGARITHMICALLY EQUISPACED FREQUENCY CHANNELS CENTERED FROM 23 HZ TO 200 KHZ WITH A 15 PERCENT BANDWIDTH AT 1 DB. AVERAGING TIME WAS 2.5 SEC AT THE HIGH DUTY RATE. THE COMBINATIONS OF ELEMENTS AND THE SEQUENCE OF FREQUENCIES TO BE MEASURED WERE CONTROLLED EITHER BY AN ONBOARD COMPUTER OR FROM THE GROUND.

----- IMP-1, McDONALD -----

EXPERIMENT NAME- SOLAR AND GALACTIC COSMIC-RAY STUDIES

NSSDC ID- 71-019A-08

LAST REPORTED STATE- LAUNCHED AND OPERATING *****
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.B. McDONALDNASA-GSFC
GREENBELT, MD
OI - B.J. TEEGARDENNASA-GSFC
GREENBELT, MD
OI - D.E. MAGGIENASA-JSC
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION
THE GSFC COSMIC-RAY EXPERIMENT WAS DESIGNED TO MEASURE ENERGY SPECTRA, COMPOSITION, AND ANGULAR DISTRIBUTIONS OF SOLAR AND GALACTIC ELECTRONS, PROTONS, AND HEAVIER NUCLEI UP TO Z = 26. THREE DISTINCT DETECTOR SYSTEMS WERE USED. THE FIRST SYSTEM CONSISTED OF FOUR ESSENTIALLY IDENTICAL SOLID-STATE TELESCOPES. TWO WERE PERPENDICULAR AND TWO WERE PARALLEL TO THE SPACECRAFT SPIN AXIS. BECAUSE THE TELESCOPES DIFFERED IN THEIR ABSORBING THICKNESSES, SOME DISCRIMINATION BETWEEN ELECTRONS AND PROTONS WAS POSSIBLE. EACH DETECTOR RESPONDED TO PARTICLES BETWEEN ABOUT 50 KEV AND 2 MEV. A SEVEN-LEVEL INTEGRAL ANALYZER WAS INCLUDED FOR SPECTRAL INFORMATION. THE SECOND DETECTOR SYSTEM WAS A SOLID-STATE DE/DX VS E TELESCOPE THAT LOOKED PERPENDICULAR TO THE SPIN AXIS. THIS TELESCOPE MEASURED Z = 1 TO 16 NUCLEI WITH ENERGIES BETWEEN 4 AND 20 MEV/NUCLEON. COUNTS OF PARTICLES IN THE 0.5 TO 4 MEV/NUCLEON RANGE, WITH NO CHARGE RESOLUTION, WERE OBTAINED AS COUNTS IN THE DE/DX, BUT NOT IN THE E₁ SENSOR. THE THIRD DETECTOR SYSTEM WAS A THREE-ELEMENT TELESCOPE WHOSE AXIS MADE AN ANGLE OF 39 DEG WITH RESPECT TO THE SPIN AXIS. THE INSTRUMENT RESPONDED TO ELECTRONS BETWEEN 2 AND 12 MEV AND Z = 1 TO 30 NUCLEI IN THE ENERGY RANGE 20 TO 500 MEV/NUCLEON. FOR PARTICLES BELOW 80 MEV, THIS INSTRUMENT ACTED AS A DE/DX VS E DETECTOR. ABOVE 80 MEV, IT ACTED AS A DIRECTIONAL TRIPLE DE/DX VS E DETECTOR. BY USE OF A COMBINATION OF PULSE HEIGHT ANALYSIS AND GAIN SWITCHING, THE OUTPUT OF EACH SENSOR OF THE SECOND AND THIRD DETECTOR SYSTEMS WAS SORTED INTO ONE OF 1000 AND 1200 ENERGY CHANNELS, RESPECTIVELY. FLUX DIRECTIONALITY INFORMATION WAS OBTAINED BY DIVIDING CERTAIN PORTIONS OF THE DATA FROM EACH DETECTOR INTO EIGHT ANGULAR SECTORS. THE SECOND DETECTOR SYSTEM PERFORMED NORMALLY FROM LAUNCH UNTIL OCTOBER 14, 1971 (APOGEE SHADOW). AFTER WHICH PROBLEMS WERE ENCOUNTERED. ESSENTIALLY NO DATA WERE OBTAINED FROM THIS TELESCOPE AFTER NOVEMBER 1971. OTHERWISE, THE EXPERIMENT FUNCTIONED NORMALLY THROUGH THE SPACECRAFT LIFE.

----- IMP-1, NESS -----

EXPERIMENT NAME- MEASUREMENT OF MAGNETIC FIELDS

NSSDC ID- 71-019A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING *****
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - N.F. NESSNASA-GSFC
GREENBELT, MD
OI - J.D. SEEKNASA-GSFC
GREENBELT, MD
OI - D.H. FAIRFIELDNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO MEASURE ACCURATELY THE VECTOR MAGNETIC FIELD IN THE INTERPLANETARY MEDIUM AND IN THE EARTH'S MAGNETOSPHERE, MAGNETOTAIL, AND MAGNETOSHEATH. THE DETECTOR WAS A 300-MOUNTED TRIAXIAL FLUXGATE MAGNETOMETER WITH FOUR RANGES -- MINUS TO PLUS 10, 40, 144, AND 432 GAUSS, RESPECTIVELY. CORRESPONDING SENSITIVITIES WERE PLUS OR MINUS

0.06, 0.19, 0.56, AND 1.63 GAMMAS, RESPECTIVELY. AUTOMATIC RANGE SELECTION CAPABILITY WAS INCLUDED. A FLIPPING MECHANISM PERMITTED INFIGHT CALIBRATION OF THE THREE SENSOR ZERO LEVELS. THE VECTOR SAMPLING RATE WAS 12.5 SAMPLES PER SECOND. THE EXPERIMENT FUNCTIONED NORMALLY THROUGH THE SPACECRAFT LIFE.

----- IMP-I, SIMPSON -----

EXPERIMENT NAME- NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS

NSSDC ID- 71-019A-09

LAST REPORTED STATE- LAUNCHED AND OPERATING ***3***
AT ZERO DATA ACQUISITION RATE SINCE 10/02/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.A. SIMPSONU OF CHICAGO
CHICAGO, IL
OI - M. GARCIA-MUNOZU OF CHICAGO
CHICAGO, IL
OI - S. VERHAU OF CHICAGO
CHICAGO, IL
OI - J. HSITHU OF CHICAGO
CHICAGO, IL
OI - G.M. NASONU OF CHICAGO
CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MEASURE THE SPECTRA AND COMPOSITION OF SOLAR AND GALACTIC COSMIC RAYS AND OF MAGNETOTAIL PARTICLES. TO SERVE AS A PROTOTYPE OF INSTRUMENTS TO BE FLOWN ON THE DEEP SPACE PROBES PIONEERS 10 AND 11, AND TO PROVIDE REFERENCE 1 AU DATA FOR COMPARISON WITH THE PIONEER DATA IN GRADIENT STUDIES. THE EXPERIMENT CONSISTED OF A COMPOSITION TELESCOPE (WHICH FAILED APPROXIMATELY 10 DAYS AFTER LAUNCH), A SECOND TELESCOPE (FROM WHICH VIRTUALLY ALL THE USEFUL DATA OF THIS EXPERIMENT WERE OBTAINED), AN ELECTRON CURRENT DETECTOR (ELECTRONS ABOVE 0.4 MEV PLUS PROTONS ABOVE 21 MEV) AND A FISSION CELL (PROTONS ABOVE 120 MEV). THE LATTER TWO INSTRUMENTS WERE SPECIFICALLY INCLUDED AS PROTOTYPES OF PIONEER INSTRUMENTS DESIGNED TO MEASURE VERY HIGH FLUXES OF JOVIAN TRAPPED PARTICLES. AS SUCH THEY WERE NOT OPTIMIZED FOR MEASUREMENTS OF THE RELATIVELY LOW FLUXES IN THE EARTH'S RADIATION BELT. THE SUCCESSFUL TELESCOPE CONSISTED OF SIX COLLIMATED SENSORS (FIVE LITHIUM DRIFTED SILICON SENSORS AND ONE CSI (TI) SCINTILLATOR) AND AN ANTICINCIDENCE SCINTILLATOR. THIS TELESCOPE HAD A LOOK DIRECTION THAT WAS NORMAL TO THE SPACECRAFT SPIN AXIS AND HAD AN ANGULAR APERTURE BETWEEN 40 AND 64 DEG (DEPENDENT ON COINCIDENCE MODE CHOSEN). COINCIDENCE MODE RATES (5-12 SEC ACCUMULATIONS, CORRESPONDING TO PROTONS IN THE RANGES 0.5-10.6, 10.6-19.0, 29.3-66.7 AND ABOVE 66.7 MEV WERE OBTAINED EACH 10-24 SEC. PULSE HEIGHT ANALYSIS (ONE EVENT EVERY 20-48 SEC) WAS USED WITH THESE RATES TO STUDY CHANGE COMPOSITION (UP TO 2 OF 81, ISOTOPIC COMPOSITION (FOR 2 OF 1 AND 2), AND ELECTRON FLUXES. THE SPACECRAFT ONBOARD COMPUTER WAS USED TO PERMIT SOME OF THE OBJECTIVES ASSIGNED TO THE COMPOSITION TELESCOPE TO BE ACHIEVED THROUGH THE SMALLER SUCCESSFUL TELESCOPE. EXCEPT FOR THE COMPOSITION TELESCOPE FAILURE, THE EXPERIMENT WORKED AS PLANNED THROUGHOUT THE SPACECRAFT LIFE.

***** IMP-J *****

SPACECRAFT COMMON NAME- IMP-J
ALTERNATE NAMES- PL-723A, IMP 8
(EXPLORER 50, 6493)

NSSDC ID- 73-078A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.

LAUNCH DATE- 10/26/73 SPACECRAFT WEIGHT- 371, KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-GSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 10/29/73
ORBIT PERIOD- 17279. MIN INCLINATION- 28.674 DEG
PERIAPSIS- 141105. KM ALT APOAPSIS- 208057. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 10/29/73
ORBIT PERIOD- 17279. MIN INCLINATION- 20.674 DEG
PERIAPSIS- 141105. KM ALT APOAPSIS- 208057. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - P. BUTLERNASA-GSFC
GREENBELT, MD
PS - J.H. KINGNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
IMP 8 (EXPLORER 50), THE LAST SATELLITE OF THE IMP SERIES, WAS A DRUM-SHAPED SPACECRAFT, 135.6 CM ACROSS AND 157.4 CM HIGH, INSTRUMENTED FOR INTERPLANETARY AND MAGNETOTAIL STUDIES OF COSMIC RAYS, ENERGETIC SOLAR PARTICLES, PLASMA, AND ELECTRIC AND MAGNETIC FIELDS. IMP 8 WAS 180 DEG OUT OF PHASE WITH IMP 7 (WITH WHOSE DATA MUCH CORRELATION IS INTENDED) AND WAS EXPECTED TO REMAIN APPROXIMATELY 50 FOR ITS FIRST 500 DAYS

IN ORBIT. ITS INITIAL ORBIT WAS MORE ELLIPTICAL THAN INTENDED, WITH APOGEE AND PERIGEE DISTANCES OF ABOUT 45 AND 25 EARTH RADII. IT IS EXPECTED TO HAVE A NEAR-CIRCULAR ORBIT AFTER ABOUT TWO YEARS. THE SPACECRAFT SPIN AXIS WAS NORMAL TO THE ECLIPTIC PLANE, AND THE SPIN RATE WAS 23 RPM. AFTER SOME EARLY SPACECRAFT PROBLEMS, WHICH WERE OVERCOME WITHIN A FEW WEEKS AFTER LAUNCH, THE SPACECRAFT PERFORMED NORMALLY.

----- IMP-J, AGGSON -----

EXPERIMENT NAME- ELECTROSTATIC FIELDS

NSSDC ID- 73-078A-11

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.L. AGGSONNASA-GSFC
GREENBELT, MD
OI - J.P. HEPPNERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

A BIAXIAL ANTENNA SYSTEM WITH ELECTROMETERS TO MEASURE THE POTENTIAL DIFFERENCE BETWEEN THE TWO HALVES OF EACH ANTENNA DETERMINED THE VECTOR ELECTROSTATIC FIELD WITH A SENSITIVITY OF 0.1 MV PER METER. ONE ANTENNA LAID ALONG THE SPACECRAFT SPIN AXIS AND THE OTHER WAS NORMAL TO THIS AXIS. MEASUREMENTS WERE MADE IN THE SOLAR WIND, IN THE TRANSITION REGION, AND IN THE GEOMAGNETIC TAIL.

----- IMP-J, BAME -----

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA

NSSDC ID- 73-070A-10

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.J. BAMELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.R. ASBRIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

A HEMISPHERICAL ELECTROSTATIC ANALYZER MEASURED THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, MAGNETOSHEATH, AND MAGNETOTAIL. IONS AS HEAVY AS OXYGEN WERE RESOLVED WHEN THE SOLAR WIND TEMPERATURE IS LOW. ENERGY ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. IN THE SOLAR WIND, POSITIVE IONS FROM 200 EV TO 5 KEV (15 PERCENT SPACING, 3 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) WERE STUDIED. IN THE MAGNETOSHEATH, POSITIVE IONS FROM 200 EV TO 5 KEV (15 PERCENT SPACING, 3 PERCENT RESOLUTION) AND FROM 200 EV TO 20 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) WERE STUDIED. IN THE MAGNETOTAIL, POSITIVE IONS FROM 200 EV TO 20 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND ELECTRONS FROM 5 EV TO 1 KEV (30 PERCENT SPACING, 15 PERCENT RESOLUTION) AND FROM 100 EV TO 20 KEV (15 PERCENT RESOLUTION) WERE STUDIED.

----- IMP-J, BRIDGE -----

EXPERIMENT NAME- MEASUREMENT OF SOLAR PLASMA

NSSDC ID- 73-070A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.S. BRIDGEMASS INST OF TECH
CAMBRIDGE, MA
OI - A.J. LAZARUSMASS INST OF TECH
CAMBRIDGE, MA
OI - J.H. BINSACKMASS INST OF TECH
CAMBRIDGE, MA
OI - E.F. LYONMASS INST OF TECH
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

A MODULATED SPLIT-COLLECTOR FARADAY CUP, PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, TRANSITION REGION, AND MAGNETOTAIL. ELECTRONS WERE STUDIED IN EIGHT LOGARITHMICALLY EQUISPACED ENERGY CHANNELS BETWEEN 17 EV AND 7 KEV. POSITIVE IONS WERE STUDIED IN EIGHT CHANNELS BETWEEN 50 EV AND 7 KEV. A SPECTRUM WAS OBTAINED EVERY EIGHT SPACECRAFT REVOLUTIONS. ANGULAR INFORMATION WAS OBTAINED IN EITHER 15 EQUALLY SPACED INTERVALS DURING A 360-DEG REVOLUTION OF THE SATELLITE OR MORE CLOSELY ABOUT THE SPACECRAFT SUNLINE.

----- IMP-J, FRANK -----

EXPERIMENT NAME- MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS

NSSDC ID- 73-078A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - L.A. FRANKU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRA OF LOW-ENERGY ELECTRONS AND PROTONS IN THE GEOCENTRIC RANGE 30 TO 40 RIE) TO GIVE FURTHER DATA ON GEOMAGNETIC STORMS, AURORA, TAIL AND NEUTRAL SHEET, AND OTHER MAGNETOSPHERIC PHENOMENA. THE DETECTOR WAS A DUAL-CHANNEL CURVED PLATE ELECTROSTATIC ANALYZER (LEPPDEA - LOW ENERGY PROTON AND ELECTRON DIFFERENTIAL ANALYZER) WITH 16 ENERGY INTERVALS BETWEEN 6 EV AND 30 KEV. IT HAD AN ANGULAR FIELD OF VIEW OF 9 DEG X 25 DEG. THE DETECTOR MAY BE OPERATED IN ONE OF TWO MODES (1) ONE PROVIDING GOOD ANGULAR RESOLUTION (16 DIRECTIONS FOR EACH PARTICLE ENERGY BAND) ONCE EACH 272 SEC. AND (2) ONE PROVIDING GOOD TEMPORAL RESOLUTION IN WHICH THE ENTIRE ENERGY RANGE IN FOUR DIRECTIONS IS MEASURED EVERY 68 SEC.

----- IMP-J, GLOECKLER -----

EXPERIMENT NAME- SOLID-STATE DETECTORS

NSSDC ID- 73-078A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G. GLOECKLERU OF MARYLAND
COLLEGE PARK, MD
OI - C.Y. FANU OF ARIZONA
TUCSON, AZ
OI - D.K. MOVESTADTMPI
GARCHING, FRG REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO DETERMINE THE COMPOSITION AND ENERGY SPECTRA OF LOW-ENERGY PARTICLES OBSERVED DURING SOLAR FLARES AND 27-DAY RECURRENT EVENTS. THE DETECTORS USED INCLUDE (1) AN ELECTROSTATIC ANALYZER TO SELECT PARTICLES OF THE DESIRED ENERGY PER CHARGE) COMBINED WITH AN ARRAY OF WINDOWLESS SOLID-STATE DETECTORS (TO MEASURE THE ENERGY LOSS) AND SURROUNDED BY AN ANTICINCIDENCE SHIELDING AND (2) A THIN WINDOW PROPORTIONAL COUNTER. SOLID-STATE PARTICLE TELESCOPE. THE EXPERIMENT MEASURED PARTICLE ENERGIES FROM 0.1 TO 13 MEV PER CHARGE IN 12 BANDS AND UNIQUELY IDENTIFIED POSITRONS AND ELECTRONS AS WELL AS NUCLEI WITH CHARGES OF 2 FROM 1 TO 8 (NO CHARGE RESOLUTION FOR Z GREATER THAN 0). TWO 1000-CHANNEL PULSE HEIGHT ANALYZERS, ONE FOR EACH DETECTOR, WERE INCLUDED IN THE EXPERIMENT PAYLOAD.

----- IMP-J, GURNETT -----

EXPERIMENT NAME- ELECTROSTATIC WAVES AND RADIO NOISE

NSSDC ID- 73-078A-12

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - T.L. AGGSONNASA-GSFC
GREENBELT, MD
OI - G.W. PFEIFFERU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION
A WIDE-BAND RECEIVER WAS USED TO OBSERVE HIGH-RESOLUTION FREQUENCY-TIME SPECTRA, AND A SIX-CHANNEL NARROW-BAND RECEIVER WITH A VARIABLE CENTER FREQUENCY WILL BE USED TO OBSERVE WAVE CHARACTERISTICS. THE RECEIVERS OPERATED FROM THREE ANTENNA SYSTEMS. THE FIRST SYSTEM CONTAINED A PAIR OF LONG DIPOLE ANTENNAS (ONE, EXTENDABLE TO 400 FT, NORMAL TO THE SPACECRAFT SPIN AXIS AND THE OTHER ANTENNA, EXTENDABLE TO 20 FT, ALONG THE SPIN AXIS). THE SECOND SYSTEM CONTAINED A BOOM-MOUNTED TRIAD OF ORTHOGONAL LOOP ANTENNAS. THE THIRD SYSTEM CONSISTED OF A BOOM-MOUNTED 20-IN. SPIN AXIS DIPOLE. THE MAGNETIC AND ELECTRIC FIELD INTENSITIES AND FREQUENCY SPECTRA, POLARIZATION, AND DIRECTION OF ARRIVAL OF NATURALLY OCCURRING RADIO NOISE IN THE MAGNETOSPHERE WERE OBSERVED. PHENOMENA STUDIED WERE THE TIME-SPACE DISTRIBUTION, ORIGIN, PROPAGATION, DISPERSION, AND OTHER CHARACTERISTICS OF RADIO NOISES OCCURRING ACROSS AND ON EITHER SIDE OF THE MAGNETOSPHERIC BOUNDARY REGION. THE FREQUENCY RANGE FOR ELECTRIC FIELDS WAS 0.3 HZ TO 200 KHZ AND FOR MAGNETIC FIELDS, IT WAS 20 HZ TO 200 KHZ.

----- IMP-J, KRINIGIS -----

EXPERIMENT NAME- CHARGED PARTICLE MEASUREMENTS
EXPERIMENT

NSSDC ID- 73-078A-08

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/00/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S.M. KRINIGISAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - T.P. ARMSTRONGU OF KANSAS
LAWRENCE, KS
OI - J.A. VAN ALLENU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION
THREE SOLID-STATE DETECTORS IN AN ANTICINCIDENCE PLASTIC SCINTILLATOR OBSERVED ELECTRONS BETWEEN 0.2 AND 2.5 MEV, PROTONS BETWEEN 0.3 AND 500 MEV, ALPHA PARTICLES BETWEEN 2.0 AND 200 MEV, HEAVY PARTICLES WITH Z VALUES RANGING FROM 2 TO 5 WITH ENERGIES GREATER THAN 0 MEV, HEAVY PARTICLES WITH Z VALUES RANGING BETWEEN 6 AND 8 WITH ENERGIES GREATER THAN 32 MEV, AND INTEGRAL PROTONS AND ALPHAS OF ENERGIES GREATER THAN 50 MEV/NUCLEON. ALL WITH DYNAMIC RANGES OF 1 TO ONE MILLION (PER SQUARE CM-SEC-STER). FIVE THIN WINDOW GEIGER-MUELLER TUBES OBSERVED ELECTRONS OF ENERGY GREATER THAN 15 KEV, PROTONS OF ENERGY GREATER THAN 250 KEV, AND X RAYS WITH WAVELENGTHS BETWEEN 2 AND 10 A. ALL WITH A DYNAMIC RANGE OF 10 TO 100 MILLION (PER SQUARE CM-SEC-STER). PARTICLES AND X RAYS PRIMARILY OF SOLAR ORIGIN WERE STUDIED, BUT THE DYNAMIC RANGE AND RESOLUTION OF THE INSTRUMENT PERMITTED OBSERVATION OF COSMIC RAYS AND MAGNETOTAIL PARTICLES.

----- IMP-J, McDONALD -----

EXPERIMENT NAME- SOLAR AND COSMIC-RAY PARTICLES

NSSDC ID- 73-078A-09

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - F.D. McDONALDNASA-GSFC
GREENBELT, MD
OI - D.F. HAGGENASA-JSC
HOUSTON, TX
OI - D.J. TEGARDENNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE GSFC COSMIC-RAY EXPERIMENT WAS DESIGNED TO MEASURE ENERGY SPECTRA, COMPOSITION, AND ANGULAR DISTRIBUTIONS OF SOLAR AND GALACTIC ELECTRONS, PROTONS, AND HEAVY NUCLEI UP TO Z = 30. THREE DISTINCT DETECTOR SYSTEMS WERE USED. THE FIRST SYSTEM CONSISTED OF A PAIR OF SOLID-STATE TELESCOPES WHICH MEASURED INTEGRAL FLUXES OF ELECTRONS ABOVE 150, 350, AND 700 KEV AND OF PROTONS ABOVE .05, .15, .50, .70, 1.0, 1.2, 2.0, 2.5, 5.0, 15, AND 25 MEV. EXCEPT FOR THE .05 MEV PROTON MODE, ALL COUNTING MODES HAD NUCL SPECIES IDENTIFICATION. THE SECOND DETECTOR SYSTEM WAS A SOLID-STATE DE/DX VS E TELESCOPE THAT LOOKED PERPENDICULAR TO THE SPIN AXIS. THIS TELESCOPE MEASURED Z = 1 TO 16 NUCLEI WITH ENERGIES BETWEEN 4 AND 20 MEV/NUCLEON. COUNTS OF PARTICLES IN THE 0.5 TO 4 MEV/NUCLEON RANGE, WITH NO CHARGE RESOLUTION, WERE OBTAINED AS COUNTS IN THE DE/DX BUT NOT IN THE E SENSOR. THE THIRD DETECTOR SYSTEM WAS A THREE-ELEMENT TELESCOPE WHOSE AXIS MADE AN ANGLE OF 39 DEG WITH RESPECT TO THE SPIN AXIS. THE MIDDLE ELEMENT WAS A CSI SCINTILLATOR, WHILE THE OTHER TWO ELEMENTS WERE SOLID-STATE SENSORS. THE INSTRUMENT RESPONDED TO ELECTRONS BETWEEN 2 AND 12 MEV AND TO Z = 1 TO 30 NUCLEI IN THE ENERGY RANGE 20 TO 500 MEV/NUCLEON. FOR PARTICLES BELOW 80 MEV, THIS INSTRUMENT ACTED AS A DE/DX DETECTOR. ABOVE 80 MEV, IT ACTED AS A BIDIRECTIONAL TRIPLE DE/DX DETECTOR. FLUX DIRECTIONALITY INFORMATION WAS OBTAINED BY DIVIDING CERTAIN PORTIONS OF THE DATA FROM EACH DETECTOR INTO EIGHT ANGULAR SECTIONS.

----- IMP-J, NESS -----

EXPERIMENT NAME- MAGNETIC FIELD EXPERIMENT

NSSDC ID- 73-078A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - N.F. NESSNASA-GSFC
GREENBELT, MD
OI - C.S. SEARCENASA-GSFC
GREENBELT, MD
OI - J.B. SEEKNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF A BOOM-MOUNTED TRIAXIAL FLUXGATE MAGNETOMETER DESIGNED TO STUDY THE INTERPLANETARY AND GEOMAGNETIC TAIL MAGNETIC FIELDS. EACH SENSOR HAD THREE DYNAMIC RANGES, PLUS OR MINUS 12, PLUS OR MINUS 36, AND PLUS OR MINUS 108 GAMMAS. WITH THE AID OF A DIT COMPACTION SCHEME (DELTA MODULATION), THERE WERE 24 VECTOR MEASUREMENTS MADE AND TELEMETERED PER SECOND.

----- IMP-J, SIMPSON -----
 EXPERIMENT NAME- SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z
 EXPERIMENTS
 NSSDC ID- 73-07DA-07
 LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
 AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.
 EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - J.A. SIMPSONU OF CHICAGO
 CHICAGO, IL
 OI - M. GARCIA-MUNOZU OF CHICAGO
 CHICAGO, IL
 EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT WAS DESIGNED TO INCREASE THE
 UNDERSTANDING OF SOLAR FLARE PARTICLE ACCELERATION AND
 PARTICLE CONTAINMENT IN MAGNETIC FIELDS IN THE VICINITY OF THE
 SUN. THE DETECTOR POINTED ALONG THE SPACECRAFT SPIN AXIS. IT
 WAS A WINDOWLESS DEVOX VS E TELESCOPE WITH ANTICOINCIDENCE
 SHIELDING AND OPERATED IN EITHER OF TWO MODES - (1) A HIGH-Z,
 LOW-E MODE HAVING AN ENERGY RANGE FROM 0.5 TO 50 MEV/NUCLEON
 AND A CHARGE RANGE Z FROM 5 TO 50 AND (2) A LOW MODE HAVING AN
 ENERGY RANGE 0 TO 1200 MEV/NUCLEON (ISOTOPES - HYDROGEN,
 DEUTERIUM, TRITIUM, HELIUM-3, HELIUM-4). THE ENERGY RANGE FOR
 ELECTRONS WAS PRIMARILY 0.3 TO 10 MEV. THE ACCEPTANCE ANGLE
 OF THE DETECTOR WAS A 50 DEG FULL ANGLE.

----- IMP-J, STONE -----
 EXPERIMENT NAME- ELECTRONS AND HYDROGEN AND HELIUM
 ISOTOPES
 NSSDC ID- 73-07DA-06
 LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
 AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.
 EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - E.C. STONECALIF INST OF TECH
 PASADENA, CA
 OI - R.E. VOGTCALIF INST OF TECH
 PASADENA, CA
 EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT WAS DESIGNED TO STUDY (VIA DIFFERENTIAL
 ENERGY SPECTRA) LOCAL ACCELERATION OF PARTICLES, ACCELERATION
 PROCESSES OF SOLAR PARTICLES, STORAGE IN THE INTERPLANETARY
 MEDIUM, AND SOLAR MODULATION OF PARTICLES IN THE
 INTERPLANETARY MEDIUM. THE DETECTOR USED WAS A MULTI-ELEMENT,
 TOTALLY DEPLETED SOLID-STATE TELESCOPE WITH ANTICOINCIDENCE
 SHIELDING, AND WAS OPERATED IN ONE OF THREE MODES -- (1) THE
 ENERGY RANGE MODE, (2) THE ELECTRON MODE (150 KEV TO 2.0 MEV),
 AND (3) THE HYDROGEN AND HELIUM ISOTOPES MODE (0.5 TO 40
 MEV/NUCLEON). THE DETECTOR HAD AN ANGULAR RESOLUTION OF PLUS
 TO MINUS 22 DEG.

----- IMP-J, WILLIAMS -----
 EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS
 NSSDC ID- 73-07RA-05
 LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
 AT THE STANDARD DATA ACQUISITION RATE SINCE 10/26/73.
 EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - D.J. WILLIAMSNOAA-PRL
 BOULDER, CO
 OI - C.O. DUSTROMAPPLIED PHYSICS LAB
 SILVER SPRING, MD
 OI - J.C. ARMSTRONGAPPLIED PHYSICS LAB
 SILVER SPRING, MD
 OI - J.H. TRAINORNASA-GSFC
 GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
 THE PURPOSES OF THIS EXPERIMENT WERE (1) TO STUDY THE
 PROPAGATION CHARACTERISTICS OF SOLAR COSMIC RAYS THROUGH THE
 INTERPLANETARY MEDIUM OVER THE ENERGY RANGES INDICATED BELOW,
 (2) TO STUDY ELECTRON AND PROTON PATCHES THROUGHOUT THE
 GEOMAGNETIC TAIL AND NEAR AND THROUGH THE FLANKS OF THE
 MAGNETOPAUSE, AND (3) TO STUDY THE ENTRY OF SOLAR COSMIC RAYS
 INTO THE GEOMAGNETIC FIELD. THE INSTRUMENTATION CONSISTED OF A
 THREE-ELEMENT TELESCOPE CONFIGURATION EMPLOYING SOLID-STATE
 DETECTORS AND A MAGNETIC FIELD TO DEFLECT ELECTRONS. TWO
 SIDE-MOUNTED DETECTORS WERE USED TO DETECT THE ELECTRONS
 DEFLECTED BY THE MAGNET. TWO ADDITIONAL SOLID-STATE DETECTORS
 WERE USED TO DETECT VERY LOW-ENERGY (GREATER THAN 15 KEV)
 PROTONS, ALPHA PARTICLES, AND CHARGED PARTICLES OF Z GREATER
 THAN 2. THE EXPERIMENT WAS DESIGNED TO MEASURE (1) PROTON
 FLUXES FROM 30 KEV TO GREATER THAN 0.6 MEV IN SIX RANGES, (2)
 ELECTRON FLUXES FROM 30 KEV TO GREATER THAN 450 KEV IN THREE
 RANGES, (3) CHARGED PARTICLES GREATER THAN 15 KEV, (4) ALPHA
 PARTICLES IN FOUR RANGES, GREATER THAN 0.5 MEV, GREATER THAN
 1.0 MEV, 2.2 TO 8.8 MEV, AND 0.8 TO 35 MEV, AND (5) CHARGED
 PARTICLES OF Z GREATER THAN 2 AT E GREATER THAN 5 MEV.

***** INDIAN SCIENTIFIC SAT. *****
 SPACECRAFT COMMON NAME- INDIAN SCIENTIFIC SAT.
 ALTERNATE NAMES-
 NSSDC ID- INDASAT

LAST REPORTED STATE- AN APPROVED MISSION
 LAUNCH DATE- 12/00/74 SPACECRAFT WEIGHT- 300. KG
 LAUNCH SITE-
 LAUNCH VEHICLE-
 SPONSORING COUNTRY/AGENCY
 INDIA ISRO
 PLANNED ORBIT PARAMETERS
 ORBIT TYPE- GEOCENTRIC
 ORBIT PERIOD- MIN INCLINATION- DEG
 PERIAPSIS- 600. KM ALT APOAPSIS- 600. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PM - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION
 THE INDIAN SCIENTIFIC SATELLITE WILL BE THE FIRST
 SATELLITE WHOLLY DESIGNED AND FABRICATED IN INDIA. IT WILL BE
 LAUNCHED BY THE USSR AND WILL CARRY EXPERIMENTS COVERING THREE
 AREAS -- X-RAY ASTRONOMY, SOLAR NEUTRON AND GAMMA RAYS, AND
 IONOSPHERIC PHYSICS. THE SATELLITE WILL BE SPIN STABILIZED AND
 WILL BE LAUNCHED INTO A NEAR-CIRCULAR ORBIT. THE NECESSARY
 GROUND TELEMETRY AND TELECOMMAND STATIONS WILL BE ESTABLISHED
 AT SRINAGAR.

----- INDIAN SCIENTIFIC SAT., DANIEL -----
 EXPERIMENT NAME- SOLAR NEUTRON AND GAMMA RAYS
 NSSDC ID- INDASAT-02
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - R.R. DANIELUNKNOWN
 INDIA
 OI - P.J. LAUKAREUNKNOWN
 INDIA

EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT IS DESIGNED TO DETECT EMISSION OF
 ENERGETIC NEUTRONS FROM 10 TO 500 MEV AND GAMMA RAYS FROM 200
 KEV TO 20 MEV ASSOCIATED WITH VIOLENT OUTBURSTS ON THE SUN.

----- INDIAN SCIENTIFIC SAT., RAD -----
 EXPERIMENT NAME- X-RAY ASTRONOMY
 NSSDC ID- INDASAT-01
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - U.K. RADPHYSICAL RESEARCH LAB
 AHMEDABAD, INDIA
 OI - K. KASTURIRANGANUNKNOWN
 INDIA

EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT WILL USE A NaI (TL) SCINTILLATOR AND A
 PROPORTIONAL COUNTER TO MEASURE X RAYS IN THE ENERGY RANGE 2
 TO 100 KEV FROM BOTH CELESTIAL SOURCES AND COSMIC BACKGROUND.

----- INDIAN SCIENTIFIC SAT., SATYAPRAKASH -----
 EXPERIMENT NAME- IONOSPHERIC ELECTRON TRAP AND UV
 CHAMBERS

NSSDC ID- INDASAT-03
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - SATYAPRAKASHUNKNOWN
 INDIA
 OI - B.M. SIDDHARAYAUNKNOWN
 INDIA

EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT WILL USE AN ELECTRON TRAP TO MEASURE
 ELECTRON ENERGIES UP TO 100 EV, ALONG WITH UV CHAMBERS TO
 MONITOR THE SCATTERED LYMAN-ALPHA RADIATION AND OXYGEN
 EMISSIONS IN THE NIGHT SKY.

***** INTASAT *****
 SPACECRAFT COMMON NAME- INTASAT
 ALTERNATE NAMES- INTA SATELLITE
 NSSDC ID- INTASAT

LAST REPORTED STATE- AN APPROVED MISSION
 LAUNCH DATE- 11/15/74 LAUNCH WEIGHT- 20. KG

REPRODUCIBILITY OF THE
 ORIGINAL PAGE IS POOR

LAUNCHED SUCCESSFULLY
 11/15/74

LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
SPAIN CNIE-INTA
UNITED STATES NASA-USS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 114.8 MIN INCLINATION- 101.8 DEG
PERIAPSIS- 1438. KM ALT APOAPSIS- 1455. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.W. ORRADOCNIE-INTA
YORREJON, SPAIN
PH - W.R. WITT, JR.NASA-GSFC
GREENBELT, MD
PS - G. SAGREDOCNIE-INTA
MADRID, SPAIN
PS - L. BRACENASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
INTASAT, THE FIRST SPANISH SATELLITE, WILL BE A SMALL, MAGNETICALLY ORIENTED, SPIN STABILIZED SPACECRAFT CARRYING A BEACON EXPERIMENT TO STUDY THE IONOSPHERE. INTASAT IS BEING LAUNCHED PIGGYBACK WITH ITOS-G. THE SPACECRAFT WILL BE A 12-SIDED RIGHT PRISM, 44.2 CM ACROSS OPPOSITE CORNERS, AND 41 CM HIGH. THE BEACON ANTENNAS EXTEND ALONG THE SPIN AXIS FOR ABOUT 175 CM FROM THE CENTER OF BOTH ENDS OF THE SATELLITE. FOUR 49 CM TELEMETRY ANTENNAS EXTEND DIAGONALLY OUTWARD FROM ONE END. THE ATTITUDE CONTROL MAGNET WITH DAMPING BARS WILL PROVIDE ALIGNMENT TO THE LOCAL MAGNETIC FIELD VECTOR WITHIN 14 DAYS OF LAUNCH. THE 16-V POWER SYSTEM WILL BE OPERATED BY 12 NICKEL-CADMIUM BATTERIES CHARGED BY SOLAR CELLS ON THE SIDES OF THE SATELLITE. THE ORBIT WILL BE SUN-SYNCHRONOUS, WITH EQUATOR CROSSING INITIALLY OCCURRING AT NOON AND MIDNIGHT LOCAL TIME. IT IS EXPECTED THAT ABOUT 30 GROUND OBSERVERS WILL USE THE EXPERIMENT FOR IONOSPHERIC STUDY. NASA-GSFC WILL OBTAIN TELEMETRY AND SATELLITE POSITION DATA TO MONITOR AND CONTROL SPACECRAFT CONDITION AND TO PROVIDE ORBIT INFORMATION TO INCLUDE 'M' FACTORS. TELEMETRY WILL ALSO CONTAIN DATA FROM A TECHNOLOGY EXPERIMENT. INTA WILL BE RESPONSIBLE FOR COORDINATING ALL BEACON DATA ACQUISITION AND PROCESSING. BEACON POWER WILL BE TURNED ON BY A TIMER ABOUT A MINUTE AFTER SPACECRAFT SEPARATION FROM THE LAUNCH VEHICLE. A KILLER-TIMER SYSTEM WILL TURN OFF THE SPACECRAFT AT THE END OF 2 YEARS.

----- INTASAT, UNKNOWN -----

EXPERIMENT NAME- IONOSPHERIC BEACON

NSSDC ID- INTASAT-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS BEACON EXPERIMENT WILL CONSIST OF A TWO-FREQUENCY (40.0100 AND 40.01025 MHZ) TRANSMITTER, THAT WILL CONTINUOUSLY RADIATE LINEARLY POLARIZED, STABLE AND UNMODULATED SIGNALS AT A MINIMUM POWER LEVEL OF 200 MW. THE TWO-BEACON MONOPOLE ANTENNA, ONE BEACON FOR EACH FREQUENCY, WILL EXTEND FROM THE TOP AND BOTTOM OF THE SPACECRAFT ALONG THE SPACECRAFT AXIS. OVER 30 EXPERIMENTERS IN 21 DIFFERENT COUNTRIES ARE PLANNING TO PARTICIPATE, AND ADDITIONAL PARTICIPATION IS EXPECTED. THE EXPERIMENTERS WILL CALCULATE TOTAL ELECTRON CONTENT ALONG THE PROPAGATION PATH FROM SATELLITE TO GROUND, AND WILL OBSERVE IONOSPHERIC IRREGULARITIES AND SCINTILLATIONS.

***** INTERCOSMOS 10 *****

SPACECRAFT COMMON NAME- INTERCOSMOS 10

ALTERNATE NAMES- 6911

NSSDC ID- 73-082A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT AN UNKNOWN DATA ACQUISITION RATE SINCE 10/30/73.

LAUNCH DATE- 10/30/73 SPACECRAFT WEIGHT- 550. KG
LAUNCH SITE-
LAUNCH VEHICLE- UNDISC

SPONSORING COUNTRY/AGENCY
U.S.S.R. UNKNOWN

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 10/31/73
ORBIT PERIOD- 102 MIN INCLINATION- 74. DEG
PERIAPSIS- 265. KM ALT APOAPSIS- 1477. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 10/31/73
ORBIT PERIOD- 102. MIN INCLINATION- 74. DEG
PERIAPSIS- 265. KM ALT APOAPSIS- 1477. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN

PS - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION

THE MAIN SCIENTIFIC OBJECTIVE OF THIS SATELLITE WAS TO STUDY MAGNETOSPHERE-IONOSPHERE COUPLING. THE SPIN RATE OF THE SATELLITE WAS LESS THAN OR EQUAL TO ONE REVOLUTION EVERY FIVE MINUTES. DATA WERE TRANSMITTED BOTH IN REAL TIME AND IN TAPE-RECORDER MODE. THE SCIENTIFIC EXPERIMENTS ON BOARD THE SATELLITE INCLUDED MEASUREMENTS OF ELECTRIC AND MAGNETIC FIELD FLUCTUATIONS, OF LOW-ENERGY PARTICLE FLUXES, OF PLASMA CONCENTRATION AND TEMPERATURE, AND OF VLF EMISSIONS.

----- INTERCOSMOS 10, UNKNOWN -----

EXPERIMENT NAME- MAGNETIC FIELD MEASUREMENT

NSSDC ID- 73-082A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT AN UNKNOWN DATA ACQUISITION RATE SINCE 10/30/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNUNKNOWN

OI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION
A THREE-COMPONENT FLUX-GATE MAGNETOMETER WITH A FIELD-ALIGNED SPIN SYSTEM WAS USED FOR MEASURING THREE COMPONENTS OF VARIATIONS OF THE EARTH'S MAGNETIC FIELD INDUCTION VECTOR DELTA B. THE DYNAMIC RANGE OF THE MEASUREMENTS WAS 600 GAMMAS.

----- INTERCOSMOS 10, UNKNOWN -----

EXPERIMENT NAME- ELECTRIC FIELD MEASUREMENT

NSSDC ID- 73-082A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT AN UNKNOWN DATA ACQUISITION RATE SINCE 10/30/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNUNKNOWN

OI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT MEASURED ELECTRIC FIELD FLUCTUATIONS USING A DOUBLE-PROBE TECHNIQUE AND OPERATING IN THE FREQUENCY RANGE FROM 0.03 TO 70 HZ.

----- INTERCOSMOS 10, UNKNOWN -----

EXPERIMENT NAME- LOW-ENERGY PARTICLES

NSSDC ID- 73-082A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT AN UNKNOWN DATA ACQUISITION RATE SINCE 10/30/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNUNKNOWN

OI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION
AN ELECTRON AND PROTON SPECTROMETER WAS FLOWN TO MEASURE LOW-ENERGY PARTICLES IN THE ENERGY RANGES FROM 0.4 TO 5.0 KEV AND 0.05 TO 20 KEV. THE WHOLE RANGE WAS DIVIDED INTO 32 SUBRANGES. THE ENERGY RESOLUTION WAS APPROXIMATELY 5 PERCENT.

----- INTERCOSMOS 10, UNKNOWN -----

EXPERIMENT NAME- VLF EMISSIONS

NSSDC ID- 73-082A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT AN UNKNOWN DATA ACQUISITION RATE SINCE 10/30/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNUNKNOWN

OI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THE FREQUENCY RANGE OF THE BROADBAND CHANNEL WAS FROM 22 TO 22,000 HZ. THE DYNAMIC RANGE WAS 60 DECIBELS.

----- INTERCOSMOS 10, UNKNOWN -----

EXPERIMENT NAME- ELECTRON CONCENTRATION AND TEMPERATURE

NSSDC ID- 73-082A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT AN UNKNOWN DATA ACQUISITION RATE SINCE 10/30/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - UNKNOWNUNKNOWN

OI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION

A LANGMUIR PROBE WAS USED TO MEASURE ELECTRON
CONCENTRATION AND TEMPERATURE.

***** ISEE-A *****

SPACECRAFT COMMON NAME- ISEE-A

ALTERNATE NAMES- IMP-K, IMF-M

MOTHER

NSSDC ID- MOTHER

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 2HALF 77 SPACECRAFT WEIGHT- 270. KG

LAUNCH SITE- CAPE CANAVERAL, UNITED STATES

LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY

UNITED STATES NASA
INTERNATIONAL FSO

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GECENTRIC

ORBIT PERIOD- MIN INCLINATION- 28. DEG

PERIAPSIS- 500. KM ALT APOAPSIS- 131000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.J. MADDENNASA-GSFC

PS - K. OGILVIEGREENBELT, MD

PS - K. OGILVIENASA-GSFC

PS - K. OGILVIEGREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE EXPLORER CLASS MOTHER SPACECRAFT WILL BE PART OF THE
MOTHER/DAUGHTER/HELIOCENTRIC MISSION (ISEE A,B, AND C). THE
PURPOSES OF THE MISSION WILL BE -- (1) TO INVESTIGATE
SOLAR/TERRESTRIAL RELATIONSHIPS AT THE OUTERMOST BOUNDARIES OF
THE EARTH'S MAGNETOSPHERE, (2) TO EXAMINE IN DETAIL THE
STRUCTURE OF THE SOLAR WIND NEAR THE EARTH AND THE SHOCK WAVE
THAT FORMS THE INTERFACE BETWEEN THE SOLAR WIND AND EARTH, AND
(3) TO CONTINUE THE INVESTIGATION OF COSMIC RAYS AND SOLAR
FLARES IN THE INTERPLANETARY REGION NEAR 1 AU. THE MISSION
WILL THUS EXTEND THE INVESTIGATIONS OF PREVIOUS IMP
SPACECRAFT. THE MOTHER/DAUGHTER PORTION OF THE MISSION WILL
CONSIST OF TWO SPACECRAFT WITH A STATION-KEEPING CAPABILITY IN
A HIGHLY ECCENTRIC EARTH ORBIT WITH APOGEE FROM 10 TO 23 EARTH
RADII. THE SPACECRAFT WILL MAINTAIN A SMALL SEPARATION
DISTANCE, AND WILL MAKE SIMULTANEOUS COORDINATED MEASUREMENTS
TO PERMIT SEPARATION OF SPATIAL FROM TEMPORAL IRREGULARITIES
IN THE NEAR-EARTH SOLAR WIND, THE SHOCK, AND INSIDE THE
MAGNETOSPHERE.

----- ISEE-A, ANDERSON -----

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS

NSSDC ID- MOTHER -10

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER

OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.A. ANDERSONU OF CALIF, BERKELEY

OI - C.I. MENGU OF CALIF, BERKELEY

OI - F.V. COMONITIU OF CALIF, LA

OI - J.H. DISQUEPAUL SABATIER U

OI - R. FELLATTOULOUSE, FRANCE

OI - G.K. PARKSPAUL SABATIER U

OI - G.K. PARKSTOULOUSE, FRANCE

OI - G.K. PARKSU OF WASHINGTON

OI - R.P. LINSEATTLE, WA

OI - R.P. LINU OF CALIF, BERKELEY

OI - H. REMEBERKELEY, CA

OI - H. REMEPAUL SABATIER U

OI - H. REMETOULOUSE, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE, BY USING
IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT,
THE SPATIAL EXTENT, PROPAGATION VELOCITY, AND TEMPORAL
BEHAVIOR OF A WIDE VARIETY OF PARTICLE PHENOMENA. ELECTRONS
ARE TO BE MEASURED IN TWO INTERVALS OVER THE ENERGY RANGE FROM
0.1 TO 200 KEV, AND PROTONS ARE TO BE MEASURED IN THREE
INTERVALS OVER THE ENERGY RANGE FROM 10 TO 300 KEV. IDENTICAL
INSTRUMENTATION ON EACH SPACECRAFT WILL CONSIST OF A PAIR OF
SURFACE BARRIER SEMICONDUCTOR DETECTOR TELESCOPES (ONE WITH A
FOIL AND ONE WITHOUT A FOIL) AND FOUR FIXED-ENERGY ELECTRIC
FIELD PARTICLE ANALYZERS. THESE ANALYZERS WILL BE USED TO
MEASURE ELECTRONS AND PROTONS SEPARATELY AT 2 AND 6 KEV.

----- ISEE-A, DAME -----

EXPERIMENT NAME- 50-EV TO 40-KEV PROTON AND 5-EV TO

20-KEV ELECTRON PLASMA PROBE

NSSDC ID- MOTHER -01

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER

OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.J. DAMELOS ALAMOS SCI LAB

OI - M. HIGGENRIEDERLOS ALAMOS, NM

OI - K. SCHINDLERMPI

OI - J.R. ASBRIDGEGARCHING, FED REP OF GERMANY

OI - H.R. ROSENDAUERINST FOR THEOR PHYS

OI - H.R. ROSENDAUERGARCHING, FED REP OF GERMANY

OI - H.R. ROSENDAUERLOS ALAMOS SCI LAB

OI - H.R. ROSENDAUERLOS ALAMOS, NM

OI - H.R. ROSENDAUERMPI-EXTRATERRESTRIAL PHYS

OI - H.R. ROSENDAUERGARCHING, FED REP OF GERMANY

OI - H.R. ROSENDAUERMPI

OI - M.D. MONTGOMERYGARCHING, FED REP OF GERMANY

OI - M.D. MONTGOMERYLOS ALAMOS SCI LAB

OI - M.D. MONTGOMERYLOS ALAMOS, NM

OI - G. PASCHMANNMPI

OI - G. PASCHMANNGARCHING, FED REP OF GERMANY

OI - W.C. FELDMANLOS ALAMOS SCI LAB

OI - W.C. FELDMANLOS ALAMOS, NM

OI - E.W. HONESLOS ALAMOS SCI LAB

OI - E.W. HONESLOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED, IN CONJUNCTION WITH A
SIMILAR INSTRUMENT PROVIDED BY G. PASCHMANN OF MAX PLANCK
INSTITUTE FOR FLIGHT ON THE DAUGHTER SPACECRAFT, TO STUDY THE
PLASMA VELOCITY DISTRIBUTION AND ITS SPATIAL AND TEMPORAL
VARIATIONS IN THE SOLAR WIND, SHOCK, MAGNETOSHEATH,
MAGNETOPAUSE, MAGNETOTAIL, AND MAGNETOSPHERE. PROTONS FROM 50
EV TO 40 KEV AND ELECTRONS FROM 5 EV TO 20 KEV WILL BE
MEASURED IN ONE, TWO, AND THREE DIMENSIONS BY THREE 90-DEG
SPHERICAL ELECTROSTATIC ANALYZERS. THE EXPERIMENT, WHICH WILL
UTILIZE CHANNELTRON ELECTRON MULTIPLIERS AS DETECTORS, WILL
OPERATE IN TWO RANGES, WITH ENERGY RESOLUTION FOR SEVERAL
STEPS IN EACH RANGE OF 10 PERCENT OF THE CENTER ENERGY LEVEL.

----- ISEE-A, FRANK -----

EXPERIMENT NAME- HOT PLASMA

NSSDC ID- MOTHER -03

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER

OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - L.A. FRANKU OF IOWA

OI - V.N. VASYLIUNASIOWA CITY, IA

OI - V.N. VASYLIUNASMASS INST OF TECH

OI - C.F. KENNELCAMBRIDGE, MA

OI - C.F. KENNELU OF CALIF, LA

OI - C.F. KENNELLOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF
IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT,
THE SPATIAL AND TEMPORAL VARIATIONS OF THE SOLAR WIND AND
MAGNETOSHEATH ELECTRONS AND IONS. PROTONS AND ELECTRONS IN THE
ENERGY RANGE FROM 1 EV TO 50 KEV WILL BE MEASURED IN 63
CONTIGUOUS ENERGY BANDS WITH AN ENERGY RESOLUTION ($\Delta E/E$)
OF 0.1%. A QUADRISPHERICAL LOW-ENERGY PROTON AND ELECTRON
DIFFERENTIAL ENERGY ANALYZER (LEPEDE), EMPLOYING SEVEN
CONTINUOUS CHANNEL ELECTRON MULTIPLIERS IN EACH OF ITS TWO
IONS FOR PROTONS AND ONE FOR ELECTRONS) ELECTROSTATIC
ANALYZERS, WILL BE FLOWN ON BOTH THE MOTHER AND DAUGHTER
SPACECRAFT. ALL BUT 2 PERCENT OF THE FOUR-PI STER RADIUS ANGLE
FOR PARTICLE VELOCITY VECTORS WILL BE COVERED.

----- ISEE-A, GURNETT -----

EXPERIMENT NAME- 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO

200-KHZ ELECTRIC FIELD TRIAXIAL PROBES

NSSDC ID- MOTHER -07

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER

OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.A. GURNETTU OF IOWA

OI - F.L. SCARFIOWA CITY, IA

OI - F.L. SCARFTRW SYSTEMS GROUP

OI - R.W. FREDERICKSREDONDO BEACH, CA

OI - R.W. FREDERICKSTRW SYSTEMS GROUP

OI - E.J. SMITHREDONDO BEACH, CA

OI - E.J. SMITHNASA-JPL

OI - E.J. SMITHPASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, IN CONJUNCTION WITH A SIMILAR
EXPERIMENT FLOWN ON THE DAUGHTER SPACECRAFT, IS DESIGNED TO
MEASURE WAVE PHENOMENA OCCURRING WITHIN THE MAGNETOSPHERE AND
SOLAR WIND. TRIAXIAL SEARCH COILS WITH HIGH-PERMEABILITY CORES
AND TRIAXIAL ELECTRIC DIPOLES WILL BE USED. THE SEARCH COILS
WILL HAVE A FREQUENCY RESPONSE OF 10 HZ TO 10 KHZ. THE TIME
REQUIRED FOR ONE 16-CHANNEL TRIAXIAL SPECTRUM ANALYSIS WILL BE
100 MS. BROADBAND DATA WILL ALSO BE AVAILABLE WITH A 10-KHZ
BANDWIDTH ABOUT EVERY 1 MS. ELECTRIC FIELDS WILL BE MEASURED
BY TWO ORTHOGONAL 123-M TIP-TO-TIP DIPOLES IN THE SPACECRAFT
SPIN PLANE AND ONE 0.5-M DIPOLE ALONG THE SPIN AXIS. THE TIME
REQUIRED FOR TRIAXIAL 12-CHANNEL SPECTRUM ANALYSIS FROM 10 HZ

TO 200 KHZ WILL ALSO BE 100 HS. BROADBAND DATA WILL ALSO BE AVAILABLE WITH A 10-KHZ BANDWIDTH AND 1-HS TIME RESOLUTION.

----- ISEE-A, HARVEY -----

EXPERIMENT NAME- ACTIVE PLASMA EXPERIMENT

NSSDC ID- MOTHER -08

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.C. HARVEYPARIS OBSERVATORY
PARIS, FRANCE
OI - M. PETITCNET
PARIS, FRANCE
OI - J.R. MCAFEENDAA-ERL
BOULDER, CO
OI - D. JONESESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - J.H. ETCHETOCNET
PARIS, FRANCE
OI - R.J.L. GRARDESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - R. GENDRINCNET
PARIS, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE PLASMA ELECTRON DENSITY NEAR THE MOTHER SATELLITE AND ALSO THE TOTAL ELECTRON CONTENT BETWEEN THE MOTHER AND DAUGHTER SPACECRAFT. THE EXPERIMENT WILL CONSIST OF TWO DISTINCT PARTS -- (1) THE MOTHER SPACECRAFT WILL CARRY AN EXPERIMENT TO DETECT RESONANCES OF THE AMBIENT PLASMA. AFTER AN ANTENNA HAS BEEN MOMENTARILY EXCITED AT ONE OF THE CHARACTERISTIC FREQUENCIES OF THE PLASMA IN WHICH IT IS IMMersed, A PRONOUNCED 'RINGING' WILL BE OBSERVED. THESE RESONANCES OCCUR AT THE PLASMA FREQUENCY, THE UPPER HYBRID RESONANCE, THE CYCLOTRON FREQUENCY AND ITS HARMONICS, AND THE MEASUREMENT OF THEIR FREQUENCIES WILL PERMIT THE DETERMINATION OF SEVERAL PLASMA PARAMETERS, INCLUDING THE ELECTRON DENSITY. IN THIS EXPERIMENT, THE TRANSMITTER WILL BE DESIGNED TO STEP THROUGH A NUMBER OF SUB-BANDS, COVERING THE CHARACTERISTIC RESONANCE FREQUENCIES OF THE PLASMA. AND (2) THE INTEGRATED DENSITY BETWEEN THE MOTHER AND THE DAUGHTER WILL BE OBTAINED FROM A SECOND EXPERIMENT WHICH WILL MEASURE THE PHASE DELAY INTRODUCED BY THE AMBIENT PLASMA. ONTO A WAVE OF FREQUENCY ABOUT 1 MHZ TRANSMITTED FROM THE MOTHER AND RECEIVED ON THE DAUGHTER (EXPERIMENT 6). THE PHASE WILL BE COMPARED AGAINST A PHASE-COHERENT SIGNAL TRANSMITTED FROM THE MOTHER TO THE DAUGHTER BY MODULATION ONTO A CARRIER OF FREQUENCY HIGH ENOUGH TO BE UNAFFECTED BY THE AMBIENT PLASMA.

----- ISEE-A, HELLIWELL -----

EXPERIMENT NAME- VLF WAVE INJECTION

NSSDC ID- MOTHER -13

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.A. HELLIWELLSTANFORD U
STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS INTENDED TO PROVIDE DATA TO STUDY INTERACTIONS BETWEEN DISCRETE VLF WAVES AND ENERGETIC PARTICLES IN THE MAGNETOSPHERE. THE VLF WAVES WILL BE PRODUCED BY A GROUND-BASED TRANSMITTER. INJECTION OF THE WAVE BEYOND THE IONOSPHERE WILL BE ASSURED BY TRANSMITTER LOCATION IN A REGION WHERE THE MAGNETIC LINES OF FORCE ARE OPEN. IN THIS CASE SIPLE STATION, ANTARCTICA. THE INJECTED SIGNAL AND ANY STIMULATED VLF EMISSIONS WILL BE RECORDED THROUGH A LOOP ANTENNA BY A 1- TO 20-KHZ BROADBAND RECEIVER ON THE SATELLITE. THE OBSERVED PARAMETERS WILL BE INTENSITY OF RECEIVED RADIO FREQUENCY AS A FUNCTION OF TIME.

----- ISEE-A, HEPPNER -----

EXPERIMENT NAME- DC ELECTRIC FIELDS

NSSDC ID- MOTHER -11

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.P. HEPPNERNASA-GSFC
GREENBELT, MD
OI - T.L. AGGSONNASA-GSFC
GREENBELT, MD
OI - N.C. MAYNARDNASA-GSFC
GREENBELT, MD
OI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - D.A. CAUFFMANAEROSPACE CORP
FL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS INTENDED TO STUDY QUASI-STATIC ELECTRIC FIELD AND LOW-FREQUENCY PLASMA WAVES IN THE

PLASMASPHERE, MAGNETOSPHERE, MAGNETOSHEATH, AND SOLAR WIND. A 165-M TIP-TO-TIP DIPOLE ANTENNA WILL BE USED TO MAKE DC AND AC ELECTRIC FIELD MEASUREMENTS IN THE FOLLOWING NINE FREQUENCY WINDOWS -- 0.1 TO 0.32 HZ, 0.32 TO 1 HZ, 1 TO 3.2 HZ, 3.2 TO 10 HZ, 10 TO 32 HZ, 32 TO 100 HZ, 100 TO 320 HZ, 320 TO 1000 HZ, AND 1000 TO 3200 HZ. DC MEASUREMENTS WILL BE MADE IN ANY OF 256 ANGULAR SECTIONS THREE TIMES OR 24 TIMES PER SEC. DEPENDING ON THE BIT RATE. DC NOISE MEASUREMENTS WILL HAVE A TWO-STEP VARIABLE GAIN CONTROLLED FROM THE GROUND. THE RESOLUTION IN THE HIGHEST GAIN STATE WILL BE 0.12 MV WITH A DYNAMIC RANGE OF PLUS OR MINUS 0.903 V. THE AC MEASUREMENT ELECTRONICS WILL CONSIST OF TWO AMPLIFIER SECTIONS. ONE AMPLIFIER WILL BE USED FOR LOW-FREQUENCY CHANNELS, AND ONE FOR HIGH-FREQUENCY CHANNELS. GAIN FOR EACH AMPLIFIER WILL BE CONTROLLABLE INDEPENDENTLY FROM THE GROUND. IN THE HIGHEST GAIN MODE, EACH ANALYZER CHANNEL WILL HAVE A SENSITIVITY OF 0.6 MICROVOLTS RMS. THE EXPERIMENT CAN BE RUN IN EITHER A SUN-SENSOR SYNCHRONIZED OR FREE STATE AS CONTROLLED FROM THE GROUND. IN ADDITION, THE AC PORTION CAN BE RUN IN AN AVERAGING MODE, OR AN ALTERNATING AVERAGING AND PEAK AMPLITUDE DETECTION MODE PER TELEMETRY READOUT SEQUENCE.

----- ISEE-A, HOVESTADT -----

EXPERIMENT NAME- LOW-ENERGY COSMIC-RAY COMPOSITION

NSSDC ID- MOTHER -05

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.K. HOVESTADTMPI
GARCHING, FED REP OF GERMANY
OI - J.J. O'GALLAGHERU OF MARYLAND
COLLEGE PARK, MD
OI - M. SCHULERMPI-EXTRATERR PHYS
GARCHING, FED REP OF GERMANY
OI - L.A. FISKNASA-GSFC
GREENBELT, MD
OI - C.Y. FANU OF ARIZONA
TUCSON, AZ
OI - G. GLOCKLERU OF MARYLAND
COLLEGE PARK, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE HELIOCENTRIC AND MOTHER SPACECRAFT, THE NUCLEAR AND IONIC CHARGE AS WELL AS ISOTOPIC COMPOSITION OF INTERPLANETARY AND MAGNETOSPHERIC HEAVY PARTICLES. THE MEASUREMENTS WILL BE MADE OF THE FOLLOWING SPECIES IN THE DESIGNATED RANGES -- (1) SOLAR WIND IONS (5 KEV/CHARGE TO 20 MEV/CHARGE), (2) SUPRATHERMAL MULTIPLE-CHARGED IONS (2, 0 LESS THAN OR EQUAL TO 26 IN THE ENERGY RANGE 5 TO 50 KEV/NUCLEON), AND (3) TRAPPED PARTICLES (0.05 TO 6 MEV/NUCLEON). THE INSTRUMENTATION WILL CONSIST OF TWO SENSORS ON EACH SPACECRAFT WHICH WILL USE ELECTROSTATIC DEFLECTION TECHNIQUES, THIN WINDOW PROPORTIONAL COUNTERS, AND POSITION-SENSITIVE SOLID-STATE DETECTORS. THE SENSORS WILL HAVE LARGE GEOMETRICAL FACTORS OVER THE ENTIRE ENERGY RANGE, I.E., 0.04 CM² SQ STER FOR THERMAL AND SUPRATHERMAL SOLAR WIND MEASUREMENTS, AND 3 CM² SQ STER FOR LOW ENERGY COSMIC RAY MEASUREMENTS.

----- ISEE-A, MOZER -----

EXPERIMENT NAME- DC TO 12-HZ ELECTRIC FIELD PROBE

NSSDC ID- MOTHER -06

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.S. MOZERU OF CALIF, BERKELEY
BERKELEY, CA
OI - H.C. KFLLEYU OF CALIF, BERKELEY
BERKELEY, CA
OI - C.G. FALTHAMMERROYAL INST OF TECH
STOCKHOLM, SWEDEN
OI - K. KNOTTESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - A. PEDERSONESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - U.V. FAHLESONROYAL INST OF TECH
STOCKHOLM, SWEDEN

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO STUDY THE QUASI-STATIC ELECTRIC FIELD IN THE PLASMASPHERE, MAGNETOSPHERE, MAGNETOSHEATH, AND SOLAR WIND. THE 4-10-01AM SPHERES WILL BE MOUNTED AT THE END OF A 30-M BOOM IN THE SATELLITE SPIN PLANE, TO ATTEMPT TO OVERCOME THE SPACECRAFT SHEATH (A POTENTIAL PROBLEM WHICH PLAGUES MOST ELECTRIC FIELD DETECTORS). AN ELECTRON GUN IS INCLUDED ON THE SPACECRAFT BODY. THE INSTRUMENT IS TO BE SENSITIVE TO FIELDS FROM THRESHOLD TO 5 MV/M IN THE FREQUENCY BAND OF 0 TO 12 HZ.

----- ISEE-A, OGILVIE -----

EXPERIMENT NAME- THREE-DIMENSIONAL (SIX AXES), 0-EV TO 10-KEV ELECTRON SPECTROMETERS

NSSDC ID- MOTHER -02

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - K.W. NGILVIENASA-GSFC
GREENBELT, MD
OI - J.D. SCUDDERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS TO STUDY THE TRANSPORT COEFFICIENTS OF, AND TURBULENCE IN, THE COLLISIONLESS PLASMA REPRESENTED BY THE INTERPLANETARY WIND AND MAGNETOSHEATH. LOW-ENERGY SOLAR ELECTRON EVENTS, AND DYN SHOCK ASSOCIATED ELECTRONS, TWO TRIAXIAL SYSTEMS OF 127-DEG CYLINDRICAL ELECTROSTATIC ANALYZERS WILL BE USED TO MAKE THREE-DIMENSIONAL MEASUREMENTS OF THE ELECTRON DISTRIBUTION FUNCTION FROM 6 EV TO 10 KEV. MEASUREMENTS WILL BE MADE IN TWO ENERGY RANGES WITH AN ENERGY RESOLUTION OF 0.07. THE ENTIRE SET OF SIX SIMULTANEOUS SPECTROMETER MEASUREMENTS WILL BE TAKEN WHILE THE SATELLITE ROTATES THROUGH 60 DEG. EACH SPECTROMETER AXIS WILL CONSIST OF THE CURVED PLATE ANALYZER AND A CHANNELTRON DETECTOR.

----- ISEE-A, RUSSELL -----

EXPERIMENT NAME- MAGNETIC FIELDS

NSSDC ID- MOTHER -04

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.T. RUSSELLU OF CALIF, LA
LOS ANGELES, CA
OI - R.L. MCPHERSONU OF CALIF, LA
LOS ANGELES, CA
OI - P.C. HEDGECOCKIMPERIAL COLLEGE
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF A FLIPPABLE BOOM-MOUNTED TRIAXIAL FLUXGATE MAGNETOMETER THAT WILL MEASURE THE STEADY MAGNETIC FIELD AND ITS LOW-FREQUENCY VARIATIONS. THE MAGNETOMETER HAS TWO OPERATING RANGES MINUS TO PLUS (M-P) 8192 GAMMA AND M-P 512 GAMMA IN EACH VECTOR COMPONENT. THERE ARE ALSO THREE MODES, SELECTABLE IN EACH OPERATING RANGE, THE FIRST MODE DIGITIZES DATA INTO 16 BITS, AND THE OTHER TWO INVOLVE 8 BIT DIGITIZATION. OF THE LATTER TWO MODES, THE FIRST HAS DYNAMIC RANGES OF M-P 1024 GAMMA AND M-P 64 GAMMA AND THE SECOND HAS DYNAMIC RANGES OF M-P 256 GAMMA AND M-P 16 GAMMA. THE TELEMETRY BANDWIDTH OF THE MAGNETOMETER IS A FUNCTION OF OPERATING MODE AND SPACECRAFT TELEMETRY RATE, AND VARIES FROM 2 HZ AT THE 2048 BIT PER SECOND RATE IN THE DOUBLE PRECISION MODE TO 32 HZ AT THE 16 KILOBIT RATE IN EITHER OF THE TWO SINGLE PRECISION MODES. AN IDENTICAL INSTRUMENT IS TO BE FLOWN ON THE DAUGHTER SPACECRAFT, PERMITTING SEPARATION OF TEMPORAL AND SPATIAL MAGNETIC FLUCTUATIONS.

----- ISEE-A, SHARP -----

EXPERIMENT NAME- PLASMA COMPOSITION

NSSDC ID- MOTHER -12

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.O. SHARPLOCKHEED PALO ALTO
PALO ALTO, CA
OI - G. HAERENDELMPI-EXTRATERR PHYS
GARCHING, FED REP OF GERMANY
OI - H.R. ROSENDAUERMPI-EXTRATERR PHYS
GARCHING, FED REP OF GERMANY
OI - R.G. JOHNSONLOCKHEED PALO ALTO
PALO ALTO, CA
OI - E.G. SHELLYLOCKHEED PALO ALTO
PALO ALTO, CA
OI - J. GISSU OF BERNE
BERNE, SWITZERLAND
OI - P.X. EDERHARDTU OF BERNE
OFERNE, SWITZERLAND
OI - H. BALSIGERU OF BERNE
BERNE, SWITZERLAND

EXPERIMENT BRIEF DESCRIPTION
THE OBJECTIVE OF THIS INVESTIGATION WILL BE TO DETERMINE THE ION COMPOSITION AND ENERGY SPECTRA OF THE PLASMA WITHIN THE MAGNETOSHEATH, MAGNETOSHEATH, AND SOLAR WIND, AND TO DETERMINE THE ANGULAR DISTRIBUTION OF THE PLASMA IN THE MAGNETOSHEATH. AN ENERGETIC ION MASS SPECTROMETER WILL BE FLOWN THAT WILL HAVE AN ELECTROSTATIC ENERGY ANALYZER FOLLOWED BY A COMBINED CYLINDRICAL, ELECTROSTATIC/MAGNETIC MASS ANALYZER. A COMBINATION OF ELECTRON MULTIPLIERS WILL BE USED AS THE DETECTORS. THE ENERGY-PER-UNIT-CHARGE RANGE MEASURED WILL BE FROM 0 TO 40 KEV. THE MASS-PER-UNIT-CHARGE RANGE MEASURED WILL EXTEND FROM 1 TO 130 AMU.

----- ISEE-A, SIMPSON -----

EXPERIMENT NAME- MEDIUM-ENERGY COSMIC RAYS

NSSDC ID- MOTHER -14

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.A. SIMPSONU OF CHICAGO
CHICAGO, IL
OI - G.M. MASONU OF CHICAGO
CHICAGO, IL
OI - B. CARTWRIGHTU OF CHICAGO
CHICAGO, IL
OI - M. GARCIA-MUNOZU OF CHICAGO
CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO STUDY A WIDE RANGE OF INTENSITIES ENCOUNTERED IN INTERPLANETARY SPACE AND THE MAGNETOSPHERE FOR ENERGETIC COSMIC RAY NUCLEONS. THE ISOTOPES TO BE SEPARATED ARE HYDROGEN 1, HYDROGEN 2, HELIUM 3, AND HELIUM 4 FROM 10 TO 150 MEV/NUCLEON. DIFFERENTIAL ENERGY SPECTRA ARE TO BE OBTAINED FOR HYDROGEN AND HELIUM FROM 0.5 TO 150 MEV/NUCLEON AND FOR LITHIUM THROUGH COBALT (Z FROM 3 THROUGH 27) IN THE ENERGY RANGE FROM 10 TO 700 MEV/NUCLEON. THE INSTRUMENTATION WILL CONSIST OF AN EXTENDED RANGE TELESCOPE (ERT) FORMED BY A COMBINATION OF SOLID-STATE DETECTORS, A CESIUM 100IDE SCINTILLATOR, AND A PLASTIC ANTICINCIDENCE SCINTILLATOR.

----- ISEE-A, WILLIAMS -----

EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS

NSSDC ID- MOTHER -09

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMSNDA-AERL
BOULDER, CO
OI - C.O. BOSTROMAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - B. WILKENMPI-AERONOMY
LINDAU, FED REP OF GERMANY
OI - T.A. FRITZNDA-AERL
BOULDER, CO
OI - G. WIDBERENZU OF KIEL
KIEL, FED REP OF GERMANY
OI - E. KEPPLERMPI-AERONOMY
LINDAU, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO IDENTIFY AND TO STUDY PLASMA INSTABILITIES RESPONSIBLE FOR ACCELERATION, SOURCE AND LOSS MECHANISMS, AND BOUNDARY AND INTERFACE PHENOMENA THROUGHOUT THE ORBITAL RANGE OF THE MOTHER/DAUGHTER SATELLITES. A PROTON TELESCOPE AND AN ELECTRON SPECTROMETER WILL BE FLOWN ON EACH SPACECRAFT TO MEASURE DETAILED ENERGY SPECTRUM AND ANGULAR DISTRIBUTIONS. THESE DETECTORS WILL USE SILICON SURFACE BARRIER TOTALLY-DEPLETED SOLID-STATE DEVICES OF VARIOUS THICKNESSES, AREAS, AND CONFIGURATIONS. PROTONS IN 8 CHANNELS BETWEEN 20 KEV AND 2 MEV, AND ELECTRONS IN 8 CHANNELS BETWEEN 20 KEV AND 1 MEV WILL BE MEASURED. A SEPARATE SOLID STATE DETECTOR SYSTEM WILL MEASURE THE ENERGY SPECTRA AND PITCH ANGLE DISTRIBUTIONS OF ALPHA PARTICLES AND HEAVY IONS IN THE ENERGY RANGE ABOVE 150 KEV PER NUCLEON.

***** ISEE-B *****

SPACECRAFT COMMON NAME- ISEE-B
ALTERNATE NAMES- IMP-K PRIME, IME-D
DAUGHTER
NSSDC ID- DAUGHTER

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 2HALF 77 SPACECRAFT WEIGHT- 120. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS
INTERNATIONAL ESRO

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN INCLINATION- 20. DEG
PERIAPSIS- 500. KM ALT APOAPSIS- 131000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - A. HAWKWARDESRO-ESTEC
NOORDWIJK, NETHERLANDS
PS - D.E. PAGEESRO-ESTEC
NOORDWIJK, NETHERLANDS

SPACECRAFT BRIEF DESCRIPTION
THE EXPLORER CLASS DAUGHTER SPACECRAFT IS PART OF THE MOTHER/DAUGHTER/HELIOCENTRIC MISSION (ISEE A, B, AND C). THE PURPOSES OF THE MISSION WILL BE -- (1) TO INVESTIGATE SOLAR-TERRRESTRIAL RELATIONSHIPS AT THE OUTERMOST BOUNDARIES OF THE EARTH'S MAGNETOSPHERE, (2) TO EXAMINE IN DETAIL THE STRUCTURE OF THE SOLAR WIND NEAR EARTH AND THE SHOCK WAVE THAT FORMS THE INTERFACE BETWEEN THE SOLAR WIND AND EARTH, AND (3) TO CONTINUE THE INVESTIGATION OF COSMIC RAYS AND SOLAR FLARES IN THE INTERPLANETARY REGION NEAR 1 AU. THE MISSION WILL THUS EXTEND THE INVESTIGATIONS OF PREVIOUS IMP SPACECRAFT. THE

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

MOTHER/DAUGHTER PORTION OF THE MISSION WILL CONSIST OF TWO SPACECRAFT WITH A STATION-KEEPING CAPABILITY IN A HIGHLY ECCENTRIC EARTH ORBIT WITH APOLCE FROM 10 TO 23 EARTH RADII. THE SPACECRAFT WILL MAINTAIN A SMALL SEPARATION DISTANCE, AND WILL MAKE SIMULTANEOUS COORDINATED MEASUREMENTS TO PERMIT SEPARATION OF SPATIAL FROM TEMPORAL IRREGULARITIES IN THE NEAR-EARTH SOLAR WIND, THE IOW SHOCK, AND INSIDE THE MAGNETOSPHERE.

----- ISEE-B, ANDERSON -----
EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS

NSSDC ID- DAUGHTER-00

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - K.A. ANDERSONU OF CALIF, BERKELEY
BERKELEY, CA
OI - C.F. MENGU OF CALIF, BERKELEY
BERKELEY, CA
OI - J.N. BOSQUEDPAUL SADATIER U
TOULOUSE, FRANCE
OI - R. PELLATPAUL SADATIER U
TOULOUSE, FRANCE
OI - F.V. CORONITIU OF CALIF, LA
LOS ANGELES, CA
OI - H. RENEPAUL SADATIER U
TOULOUSE, FRANCE
OI - R.P. LINU OF CALIF, BERKELEY
BERKELEY, CA
OI - G.K. PARKSU OF WASHINGTON
SEATTLE, WA

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WILL BE TO DETERMINE, BY USING IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT, THE SPATIAL EXTENT, PROPAGATION VELOCITY, AND TEMPORAL BEHAVIOR OF A WIDE VARIETY OF PARTICLE PHENOMENA. ELECTRONS WILL BE MEASURED IN TWO INTERVALS OVER THE ENERGY RANGE FROM 0 TO 200 KEV, AND PROTONS WILL BE MEASURED IN THREE INTERVALS OVER THE ENERGY RANGE FROM 10 TO 300 KEV. IDENTICAL INSTRUMENTATION ON EACH SPACECRAFT WILL CONSIST OF A PAIR OF SURFACE BARRIER SEMICONDUCTOR DETECTOR TELESCOPES (ONE WITH A FOIL AND ONE WITHOUT A FOIL) AND FOUR FIXED-ENERGY ELECTRIC FIELD CHARGED PARTICLE ANALYZERS. THESE ANALYZERS WILL BE USED TO MEASURE ELECTRONS AND PROTONS SEPARATELY AT 2 AND 6 KEV.

----- ISEE-B, EGIDI -----
EXPERIMENT NAME- 50-FV TO 25-KEV ION AND 35-EV TO 7-KEV
ELECTRON PLASMA PROBES

NSSDC ID- DAUGHTER-02

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - A. EGIDIU OF ROME
ROME, ITALY
OI - G. MORENOU OF ROME
ROME, ITALY
OI - P. CERULLIU OF ROME
ROME, ITALY
OI - V. FOMISANOU OF ROME
ROME, ITALY
OI - S.C. CANTARANOU OF ROME
ROME, ITALY

EXPERIMENT BRIEF DESCRIPTION
THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO GAIN A BETTER UNDERSTANDING OF THE INTERACTION OF THE SOLAR WIND WITH THE EARTH'S MAGNETIC FIELD BY MEASURING ION AND ELECTRON FLUXES AS FUNCTIONS OF DIRECTION AND ENERGY. ONE ELECTROSTATIC ANALYZER AND FIVE FARADAY CUPS WILL BE USED TO MEASURE THE ION DISTRIBUTION FUNCTION FROM 30 EV TO 25 KEV PER UNIT CHARGE; TWO FARADAY CUPS WILL BE USED TO MEASURE THE ELECTRON DISTRIBUTION FUNCTION FROM 36 EV TO 7 KEV. THE ELECTROSTATIC ANALYZER WILL HAVE SEVERAL NARROW ENERGY WINDOWS TO MAP THE PARTICLE (ION AND ELECTRON) DISTRIBUTION FUNCTION IN DETAIL. EACH OF THE FIVE FARADAY CUP-CHANNELTRON DETECTORS WILL SERVE AS FLUX DETECTORS TO SIMULTANEOUSLY MAP THE ION DISTRIBUTION FUNCTION TO A COARSE ENERGY RESOLUTION. EACH OF THE TWO FARADAY CUP-CHANNELTRON DETECTORS WILL SERVE AS A FLUX DETECTOR TO MAP THE ELECTRON DISTRIBUTION FUNCTION TO COARSE ENERGY RESOLUTION.

----- ISEE-B, FRANK -----
EXPERIMENT NAME- HOT PLASMA

NSSDC ID- DAUGHTER-03

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - L.A. FRANKU OF IOWA
IOWA CITY, IA
OI - V.M. VASYLIUNASMASS INST OF TECH
CAMBRIDGE, MA

OI - C.F. KENNELU OF CALIF, LA
LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE MOTHER/DAUGHTER SPACECRAFT, THE SPATIAL AND TEMPORAL VARIATIONS OF THE SOLAR WIND AND MAGNETOSHEATH ELECTRONS AND IONS. PROTONS AND ELECTRONS IN THE ENERGY RANGE FROM 1 EV TO 50 KEV WILL BE MEASURED IN 63 CONTINUOUS ENERGY BANDS WITH AN ENERGY RESOLUTION ($\Delta E/E$) OF 0.17. A QUADRISPHERICAL LOW-ENERGY PROTON AND ELECTRON DIFFERENTIAL ENERGY ANALYZER (LEPEDEA), EMPLOYING SEVEN CONTINUOUS CHANNEL ELECTRON MULTIPLIERS IN EACH OF ITS TWO (ONE FOR PROTONS AND ONE FOR ELECTRONS) ELECTROSTATIC ANALYZERS WILL BE FLOWN ON BOTH MOTHER AND DAUGHTER SPACECRAFT. ALL BUT 2 PERCENT OF THE FOUR PI STER SOLID-ANGLE WILL BE COVERED FOR PARTICLE VELOCITY VECTORS.

----- ISEE-B, GURNETT -----
EXPERIMENT NAME- 10-HZ TO 10-KHZ MAGNETIC AND 10-HZ TO
200-KHZ ELECTRIC FIELD MONOAXIAL PROBES

NSSDC ID- DAUGHTER-05

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - P.L. SCARFTAM SYSTEMS GROUP
REDONDO BEACH, CA
OI - E.J. SMITHNASA-JPL
PASADENA, CA
OI - R.W. FREDERICKSTAM SYSTEMS GROUP
REDONDO BEACH, CA

EXPERIMENT BRIEF DESCRIPTION
IN THIS EXPERIMENT, A SINGLE-AXIS SEARCH COIL MAGNETOMETER WITH A HIGH PERMEABILITY CORE AND A SINGLE ELECTRIC FIELD DIPOLE (RELATIVELY SHORT) WILL MEASURE WAVE PHENOMENON OCCURRING WITHIN THE MAGNETOSPHERE AND SOLAR WIND IN CONJUNCTION WITH A SIMILAR EXPERIMENT FLOWN ON THE MOTHER SPACECRAFT. THE TIME REQUIRED FOR A 16-CHANNEL SPECTRUM ANALYSIS IN A RANGE OF 10 HZ TO 10 KHZ FROM THE SEARCH COIL WILL BE 100 MS. THE TIME REQUIRED FOR A 16-CHANNEL SPECTRUM ANALYSIS IN A RANGE OF 10 HZ TO 200 KHZ FROM THE ELECTRIC DIPOLE WILL ALSO BE 100 MS. THE DIPOLE WILL BE MOUNTED PERPENDICULAR TO THE SPIN AXIS.

----- ISEE-B, HARVEY -----
EXPERIMENT NAME- RADIO PROPAGATION RECEIVER
NSSDC ID- DAUGHTER-06
LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.C. HARVEYPARIS OBSERVATORY
PARIS, FRANCE
OI - R. GENOIRINCNET
PARIS, FRANCE
OI - J.R. MCAFEENOAA-ERL
BOULDER, CO
OI - M. PETITCNET
PARIS, FRANCE
OI - D. JONESELND-PTEC
NOORDWIJK, NETHERLANDS
OI - J.H. ETCHECOCNET
PARIS, FRANCE
OI - R.J.L. GRARDESRO-ESTEC
NOORDWIJK, NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION
THE TOTAL ELECTRON CONTENT BETWEEN THE MOTHER AND DAUGHTER WILL BE OBTAINED BY MEASURING THE PHASE DELAY INTRODUCED BY THE AMBIENT PLASMA ONTO A WAVE OF FREQUENCY ABOUT 1 MHZ, TRANSMITTED FROM THE MOTHER (EXPERIMENT 0) AND RECEIVED ON THE DAUGHTER. THE PHASE WILL BE COMPARED AGAINST A PHASE-COHERENT SIGNAL TRANSMITTED FROM THE MOTHER TO THE DAUGHTER BY MODULATION ONTO A CARRIER OF FREQUENCY HIGH ENOUGH TO BE UNAFFECTED BY THE AMBIENT PLASMA.

----- ISEE-B, KEPPLER -----
EXPERIMENT NAME- ENERGETIC ELECTRONS AND PROTONS
NSSDC ID- DAUGHTER-07
LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - E. KEPPLERMPI-ASTRONOMY
LINDAU, FED REP OF GERMANY
OI - D.J. WILLIAMSNOAA-ERL
BOULDER, CO
OI - T.A. FRITZNOAA-ERL
BOULDER, CO
OI - C.D. HUSTONAPPLIED PHYSICS LAB
SILVER SPRING, MD

DI - G. WILKENMPI-AERONAUTY
LINDAU, FED REP OF GERMANY
DI - G. WERNERZU OF KIEL
KIEL, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO IDENTIFY AND TO STUDY PLASMA INSTABILITIES RESPONSIBLE FOR ACCELERATION, SOURCE AND LOSS MECHANISMS, AND BOUNDARY AND INTERFACE PHENOMENA THROUGHOUT THE ORBITAL RANGE OF MOTHER/ DAUGHTER SATELLITES. A PHOTON TELESCOPE AND AN ELECTRON SPECTROMETER WILL BE FLOWN ON EACH SPACECRAFT TO MEASURE DETAILED ENERGY SPECTRA AND ANGULAR DISTRIBUTIONS. THESE DETECTORS WILL USE SILICON SURFACE-BARRIER, TOTALLY DEPLETED SOLID-STATE DEVICES OF VARIOUS THICKNESSES, AREAS, AND CONFIGURATIONS. PROTONS IN 4 AND 16 CHANNELS BETWEEN 25 KEV AND 2 MEV AND ELECTRONS IN 4 AND 16 CHANNELS BETWEEN 20 KEV AND 2 MEV WILL BE MEASURED.

----- ISEE-H, PASCHMANN -----

EXPERIMENT NAME- 50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE

NSSDC ID- DAUGHTER-01

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G. PASCHMANNMPI
GARCHING, FED REP OF GERMANY
DI - W.C. FELLMANLOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - E.W. HONESLOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - K. SCHINDLERINST FOR THEOR PHYS
GARCHING, FED REP OF GERMANY
DI - H. NIGGENRIFDERMPI
GARCHING, FED REP OF GERMANY
DI - S.J. DAMPLOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - H. VOLKMPI
GARCHING, FED REP OF GERMANY
DI - H.R. ROSENHAUERMPI-EXTRATERRESTRIAL PHYS
GARCHING, FED REP OF GERMANY
DI - M.D. MONTGOMERYLOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - J.W. ASBRIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE PLASMA VELOCITY DISTRIBUTIONS AND THEIR SPATIAL AND TEMPORAL VARIATIONS IN THE SOLAR WIND, BOW SHOCK, MAGNETOSHEATH, MAGNETOPAUSE, AND MAGNETOTAIL (WITHIN THE MAGNETOSPHERE). ONE-, TWO-, AND THREE-DIMENSIONAL VELOCITY DISTRIBUTIONS FOR POSITIVE IONS AND ELECTRONS WILL BE MEASURED USING TWO 90-DEG SPHERICAL ELECTROSTATIC ANALYZERS WITH CHANNELTRON ELECTRON MULTIPLIERS AS DETECTORS. IN CONJUNCTION WITH SIMILAR INSTRUMENTATION PROVIDED BY S. J. DAMP/LASL FOR THE MOTHER SPACECRAFT, PROTONS FROM 50 EV TO 40 KEV (AND ELECTRONS FROM 5 EV TO 20 KEV) WILL BE MEASURED WITH 10 PERCENT ENERGY RESOLUTION IN TWO RANGES EACH.

----- ISEE-B, RUSSELL -----

EXPERIMENT NAME- MAGNETIC FIELDS

NSSDC ID- DAUGHTER-04

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.T. RUSSELLU OF CALIF, LA
LOS ANGELES, CA
DI - R.L. MCPHERSONU OF CALIF, LA
LOS ANGELES, CA
DI - P.C. HEDGECOCKIMPERIAL COLLEGE
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A FLIPPABLE BOOM-MOUNTED TRIAXIAL FLUXGATE MAGNETOMETER THAT WILL MEASURE THE STEADY MAGNETIC FIELD AND ITS LOW-FREQUENCY VARIATIONS. THE MAGNETOMETER HAS TWO OPERATING RANGES MINUS TO PLUS (M-P) 8102 GAMMA AND M-P 512 GAMMA IN EACH VECTOR COMPONENT. THERE ARE ALSO THREE MODES, SELECTABLE IN EACH OPERATING RANGE. THE FIRST MODE DIGITIZES DATA INTO 16 BITS, AND THE OTHER TWO INVOLVE 8 BIT DIGITIZATION. OF THE LATTER TWO MODES, THE FIRST HAS DYNAMIC RANGES OF M-P 1024 GAMMA AND M-P 64 GAMMA AND THE SECOND HAS DYNAMIC RANGES OF M-P 256 GAMMA AND M-P 16 GAMMA. THE TELEMETRY BANDWIDTH OF THE MAGNETOMETER IS A FUNCTION OF OPERATING MODE AND SPACECRAFT TELEMETRY RATE, AND VARIES FROM 2 HZ AT THE 2043 BIT PER SECOND RATE IN THE DOUBLE PRECISION MODE TO 32 HZ AT THE 16 KILOBIT RATE IN EITHER OF THE TWO SINGLE PRECISION MODES. AN IDENTICAL INSTRUMENT WILL BE FLOWN ON THE MOTHER SPACECRAFT, PERMITTING SEPARATION OF TEMPORAL AND SPATIAL MAGNETIC FLUCTUATIONS.

***** ISEE-C *****

SPACECRAFT COMMON NAME- ISEE-C
ALTERNATE NAMES- STP PROBE, IMF-H
HELIOCENTRIC

NSSDC ID- HELIOCTR

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 2HALF 78 SPACECRAFT WEIGHT- 455. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES

NASA-055

PLANNED ORBIT PARAMETERS

ORBIT TYPE- HELIOCENTRIC
ORBIT PERIOD- 365. DAYS INCLINATION- 0. DEG
PERIAPSIS- 1. AU RAD APOAPSIS- 1. AU RAD

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J.J. HADENNASA-GSFC
GREENBELT, MD
PS - T.Y. VON ROSEN, TMGENASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE EXPLORER CLASS HELIOCENTRIC SPACECRAFT WILL BE PART OF THE MOTHER/DAUGHTER/HELIOCENTRIC MISSION (ISEE A,B, AND C). THE PURPOSES OF THE MISSION WILL BE (1) TO INVESTIGATE SOLAR/TERRRESTRIAL RELATIONSHIPS AT THE OUTERMOST BOUNDARIES OF THE EARTH'S MAGNETOSPHERE, (2) TO EXAMINE IN DETAIL THE STRUCTURE OF THE SOLAR WIND NEAR THE EARTH AND THE SHOCK WAVE THAT FORMS THE INTERFACE BETWEEN THE SOLAR WIND AND EARTH, AND (3) TO CONTINUE THE INVESTIGATION OF COSMIC RAYS AND SOLAR FLARES IN THE INTERPLANETARY REGION NEAR 1 AU. THE MISSION WILL THUS EXTEND THE INVESTIGATIONS OF PREVIOUS IMP SPACECRAFT. THE LAUNCH OF THREE COORDINATED SPACECRAFT IN THIS MISSION WILL PERMIT THE SEPARATION OF SPATIAL AND TEMPORAL EFFECTS. THE HELIOCENTRIC SPACECRAFT WILL BE PLACED NEAR A LORATION POINT IN THE EARTH/SUN GRAVITATIONAL FIELD, ALLOWING IT TO REMAIN BEYOND THE MAGNETOSPHERIC CAVITY IN THE SOLAR WIND. IT WILL THUS CONTINUOUSLY MONITOR CHANGES IN THE NEAR-EARTH INTERPLANETARY MEDIUM, BECAUSE BOTH THE MOTHER AND DAUGHTER SPACECRAFT WILL HAVE ECCENTRIC GEOCENTRIC ORBITS. IT IS HOPED THAT THIS MISSION WILL MEASURE THE CAUSE/EFFECT RELATIONSHIPS BETWEEN THE INCIDENT SOLAR PLASMA AND THE MAGNETOSPHERE. FINALLY, THE HELIOCENTRIC SPACECRAFT WILL ALSO PROVIDE A NEAR-EARTH BASE FOR MAKING COSMIC RAY AND OTHER PLANETARY MEASUREMENTS FOR COMPARISON WITH COINCIDENT MEASUREMENTS FROM DEEP-SPACE PROBES.

----- ISEE-C, ANDERSON -----

EXPERIMENT NAME- X RAYS AND ELECTRONS

NSSDC ID- HELIOCTR-09

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.A. ANDERSONU OF CALIF, BERKELEY
BERKELEY, CA
DI - R.P. LINU OF CALIF, BERKELEY
BERKELEY, CA
DI - D.F. SMITHHIGH ALTITUDE OBS
BOULDER, CO
DI - S.R. KANEU OF CALIF, BERKELEY
BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY SPECTRA AND ANISOTROPIES OF INTERPLANETARY AND SOLAR ELECTRONS (2 TO 500 KEV) IN THE TRANSITION ENERGY RANGE BETWEEN SOLAR WIND AND LOW-ENERGY COSMIC RAYS, AND TO STUDY WITH 1 SEC RESOLUTION THE SPECTRA OF SOLAR X RAYS (6 TO 220 KEV). THE ELECTRONS WILL BE MEASURED BY A PAIR OF PASSIVELY COOLED, SURFACE BARRIER SEMICONDUCTOR DETECTOR TELESCOPES (10-500 KEV) AND BY A HEMISPHERICAL PLATE ELECTROSTATIC ANALYZER WITH CHANNEL-MULTIPLIER DETECTORS (2-10 KEV). THE X RAYS WILL BE MEASURED BY A PROPORTIONAL COUNTER (6-20 KEV) AND A SODIUM IODIDE SCINTILLATOR (12 TO 220 KEV).

----- ISEE-C, DAVE -----

EXPERIMENT NAME- 150-EV TO 7-KEV PROTON AND 5-EV TO 2.5-KEV ELECTRON PLASMA PROBE

NSSDC ID- HELIOCTR-01

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.J. DAVELOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - J.R. ASBRIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - E.W. HONESLOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - M.D. MONTGOMERYLOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - W.C. FELDMANLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MAKE AN INTEGRATED STUDY OF THE NATURE, ORIGIN AND EVOLUTION OF STRUCTURE IN THE

INTERPLANETARY MEDIUM. ALSO, THE THERMAL STATE OF THE INTERPLANETARY PLASMA WILL BE STUDIED. UNPERTURBED BY THE EARTH'S BOW SHOCK. IN THE EXPERIMENT PROTON AND ELECTRON SOLAR PLASMA WILL BE MEASURED FROM 150 EV TO 7 KEV AND 5 EV TO 2.5 KEV IN 12 AND 16 ENERGY STEPS, RESPECTIVELY. PROTONS WILL BE MEASURED BY A 135-DEG SPHERICAL ELECTROSTATIC ANALYZER IN BOTH TWO AND THREE DIMENSIONS. STEP ENERGY RESOLUTION FOR EACH ENERGY WINDOW WILL BE 4.2 PERCENT. ELECTRONS WILL BE MEASURED BY A 90-DEG SPHERICAL ELECTROSTATIC ANALYZER, ALSO IN TWO AND THREE DIMENSIONS. THE ENERGY WINDOW PER STEP FOR ELECTRONS WILL BE 10 PERCENT. CHANNELTRON ELECTRON MULTIPLIERS WILL BE USED AS DETECTORS FOR EACH OF THE ANALYZERS.

----- ISEE-C, DE FEITER -----

EXPERIMENT NAME- ENERGETIC PROTONS

NSSDC ID- HELOCTR-08

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - L.D. DE FEITERSPACE RESEARCH LAB
UTRECHT, NETHERLANDS
OI - J.J. VAN ROOIJENSPACE RESEARCH LAB
UTRECHT, NETHERLANDS
OI - J.N. VAN GILSSPACE RESEARCH LAB
UTRECHT, NETHERLANDS
OI - R.M. VAN DEN NIEUWENHOFSPACE RESEARCH LAB
UTRECHT, NETHERLANDS
OI - K.P. MENZELESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - A.C. DURNYESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - T.R. SANDERSONESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - R.J. HYNDSIMPERIAL COLLEGE
LONDON, ENGLAND
OI - V. DOMINGOESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - D.E. PAGEESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - A. DALOGHIMPERIAL COLLEGE
LONDON, ENGLAND
OI - H. ELLIOTIMPERIAL COLLEGE
LONDON, ENGLAND
OI - C. DE JAGERSPACE RESEARCH LAB
UTRECHT, NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY PARTICLE ACCELERATION AND PROPAGATION PROCESSES IN INTERPLANETARY SPACE. MEASUREMENTS WILL BE MADE OF PROTONS FROM 0.03 TO 1.40 MEV USING THREE TWO-ELEMENT TELESCOPES. THE TELESCOPES WILL BE MOUNTED AT 30, 60, AND 135 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS. EIGHT-SECTOR DATA WILL BE OBTAINED FOR SELECTED ENERGY CHANNELS.

----- ISEE-C, HECKMAN -----

EXPERIMENT NAME- HIGH-ENERGY COSMIC RAYS

NSSDC ID- HELOCTR-05

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.H. HECKMANLAWRENCE BERKELEY LAB
BERKELEY, CA
OI - D. GREINERU OF CALIF. BERKELEY
BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE THE ISOTOPIC ABUNDANCE IN THE PRIMARY COSMIC RAYS FOR HYDROGEN THROUGH IRON. THE INSTRUMENT WILL BE A 10-ELEMENT SOLID-STATE PARTICLE TELESCOPE CONSISTING OF LITHIUM DRIFTED SILICON DETECTORS. ENERGY RANGES MEASURED WILL RUN FROM 31 TO 110 MEV FOR Z=1, AND FROM 125 TO 445 MEV FOR Z=26. ISOTOPIC RESOLUTION WILL BE LESS THAN 0.15 AMU FOR Z=1 THROUGH 26. DIRECTION OF INCIDENT NUCLEI WILL BE OBTAINED FROM A PAIR OF MULTI-WIRE PROPORTIONAL COUNTERS WITH 2 DEG RESOLUTION.

----- ISEE-C, HOVESTADT -----

EXPERIMENT NAME- LOW-ENERGY COSMIC-RAY COMPOSITION

NSSDC ID- HELOCTR-03

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.K. HOVESTADTMPI
GARCHING, FED REP OF GERMANY
OI - J.J. O'GALLAGHERU OF MARYLAND
COLLEGE PARK, MD
OI - C.Y. FANU OF ARIZONA
TUCSON, AZ
OI - G. GLOCKLERU OF MARYLAND
COLLEGE PARK, MD

OI - H. SCHOLERMPI-EXTRATERRE PHYS
GARCHING, FED REP OF GERMANY
OI - L.A. FISKNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY, BY MEANS OF IDENTICAL INSTRUMENTATION ON THE HELIOCENTRIC AND MOTHER SPACECRAFT, THE NUCLEAR AND IONIC CHARGE AS WELL AS ISOTOPIC COMPOSITION OF INTERPLANETARY AND MAGNETOSPHERIC HEAVY PARTICLES. MEASUREMENTS WILL BE MADE OF THE FOLLOWING SPECIES IN THE DESIGNATED RANGES - (1) SOLAR WIND IONS (5 KEV/CHARGE TO 20 MEV/CHARGE), (2) SUPRATHERMAL MULTIPLE-CHARGED IONS (2 KEV/CHARGE TO 50 KEV/NUCLEON), (3) LOW-ENERGY COSMIC RAYS (0.05 TO 20 MEV/NUCLEON), AND (4) TRAPPED PARTICLES (0.05 TO 6 MEV/NUCLEON). THE INSTRUMENTATION WILL CONSIST OF TWO SENSORS ON EACH SPACECRAFT THAT WILL USE ELECTROSTATIC DEFLECTION TECHNIQUES, THIN WINDOW PROPORTIONAL COUNTERS, AND POSITION SENSITIVE SOLID-STATE DETECTORS. THE SENSORS WILL HAVE LARGE GEOMETRICAL FACTORS OVER THE ENTIRE ENERGY RANGE, I.E., 0.04 SQ CM STEP FOR THERMAL AND SUPRATHERMAL SOLAR WIND MEASUREMENTS AND 3 SQ CM STEP FOR LOW-ENERGY COSMIC RAY MEASUREMENTS.

----- ISEE-C, MEYER -----

EXPERIMENT NAME- COSMIC-RAY ELECTRONS AND NUCLEI

NSSDC ID- HELOCTR-06

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P. MEYERU OF CHICAGO
CHICAGO, IL
OI - P. EVENSONU OF CHICAGO
CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY PARTICLE PROPAGATION WITHIN THE SOLAR SYSTEM AND THE PROPERTIES OF THE INTERPLANETARY MEDIUM. THE FOLLOWING SPECIES WILL BE RESOLVED - (1) ELECTRONS (DIFFERENTIAL SPECTRUM FROM 5 TO 400 MEV), (2) PROTONS (DIFFERENTIAL SPECTRUM FROM 36 TO 13,000 MEV AND INTEGRAL SPECTRUM ABOVE 13 GEV), (3) HELIUM THROUGH SULFUR (2 FROM 2 THROUGH 16, DIFFERENTIAL SPECTRUM FROM 60 TO 13,000 MEV/NUCLEON AND INTEGRAL SPECTRUM ABOVE 13 GEV/NUCLEON), AND (4) THE IRON GROUP (2 FROM 26 THROUGH 28, DIFFERENTIAL SPECTRUM FROM 150 TO 13,000 MEV/NUCLEON, AND INTEGRAL SPECTRUM ABOVE 13 GEV/NUCLEON). A CHARGED PARTICLE TELESCOPE WILL BE USED TO MAKE THESE MEASUREMENTS. IT WILL CONSIST OF A CURVED SOLID-STATE DETECTOR, A GAS CENENKOV COUNTER, A SOLID-STATE DETECTOR, A CESIUM IODIDE SCINTILLATION DETECTOR, A PLASTIC SCINTILLATION COUNTER, AND A QUARTZ CENENKOV COUNTER. THE DESIGN OF THE TELESCOPE IS BASED ON THAT USED IN EXPERIMENT 60-014A-09 FOR GGG 3.

----- ISEE-C, OGILVIE -----

EXPERIMENT NAME- MASS SPECTROMETER FOR 470 TO 10,500 EV
PER CHARGE AND 1 TO 5.6 AMU PER CHARGE

NSSDC ID- HELOCTR-11

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.W. OGILVIENASA-GSFC
GREENBELT, MD
OI - J. GEISSU OF BERNE
BERNE, SWITZERLAND
OI - M.H. ACUNANASA-GSFC
GREENBELT, MD
OI - M.A. COPLANU OF MARYLAND
COLLEGE PARK, MD
OI - D.L. LINDNASA-JSC
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN ELECTROSTATIC ENERGY ANALYZER AND A WIEEN VELOCITY FILTER CONFIGURED AS A MASS SPECTROMETER TO DETERMINE THE CHARGE STATE AND ISOTOPIC CONSTITUTION OF THE SOLAR WIND. THE INSTRUMENT WILL HAVE AN ENERGY PER UNIT CHARGE RANGE OF 0.47 TO 10.5 KEV AND A MASS PER UNIT CHARGE RANGE OF 1 TO 5.6.

----- ISEE-C, SCARF -----

EXPERIMENT NAME- 20-HZ TO 1-KHZ MAGNETIC AND 20-HZ TO
100-KHZ ELECTRIC FIELD DETECTORS

NSSDC ID- HELOCTR-07

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.L. SCARFTOW SYSTEMS GROUP
REDONDO BEACH, CA
OI - D.A. GURNETTU OF IOWA
IOWA CITY, IA
OI - E.J. SMITHNASA-JPL
PASADENA, CA

01 - R.W. FRENCHICKSTHE SYSTEMS GROUP
REDONDO BEACH, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO PROVIDE DATA FOR PLASMA WAVE STUDIES UNDERTAKEN TO GAIN A BETTER UNDERSTANDING OF THE WAVE PARTICLE INTERACTION AND PLASMA INSTABILITIES WHICH LEAD TO THE EQUIVALENT COLLISION PHENOMENA THAT PRODUCE APPARENT FLUID-LIKE BEHAVIOR IN THE SOLAR WIND NEAR 1 AU. AN ELECTRIC DIPOLE AND MAGNETIC SEARCH COIL, BOOM-MOUNTED AND ALIGNED ALONG THE SPACECRAFT SPIN AXIS, WILL BE USED TO MEASURE MAGNETIC FIELD WAVE LEVELS FROM 20 HZ TO 1 KHZ IN EIGHT CHANNELS, AND ELECTRIC FIELD LEVELS FROM 20 HZ TO 100 KHZ IN 16 CHANNELS.

----- ISEE-C, SMITH -----

EXPERIMENT NAME- MAGNETIC FIELDS

NSSDC ID- HELDCTR-02

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - E.J. SMITHNASA-JPL
PASADENA, CA
OI - L. DAVISCALIF INST OF TECH
PASADENA, CA
OI - G.L. SISCOFU OF CALIF, LA
LOS ANGELES, CA
OI - D.E. JONESBRIGHAM YOUNG U
PROVO, UT
OI - B.F. TSURUTANINASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTATION FOR THIS EXPERIMENT WILL CONSIST OF A BOOM-MOUNTED, TRIAXIAL VECTOR HELIUM MAGNETOMETER. MEASUREMENTS WILL BE MADE OF THE STEADY MAGNETIC FIELD AND ITS LOW FREQUENCY VARIATIONS. FOUR FIELD AMPLITUDE RANGES (MINUS TO PLUS 4, 14, 42, AND 146 GAMMAS) WILL BE AVAILABLE. THE INSTRUMENT WILL RANGE UP AND DOWN AUTOMATICALLY OR MAY BE COMMANDED INTO A SPECIFIC RANGE. THE FIELD EQUIVALENT NOISE POWER SPECTRAL DENSITY IS 2.6×10^{-4} GAMMA SQUARED PER HERTZ (INDEPENDENT OF FREQUENCY), OR 0.01 GAMMA RMS IN THE PASSBAND 0-0.5 HZ. A SINGLE AXIS SPECTRUM ANALYZER WILL MEASURE FLUCTUATIONS PARALLEL TO THE SPACECRAFT SPIN AXIS IN THREE FREQUENCY BANDS OF 0.1-1, 1-3, AND 3-10 HZ.

----- ISEE-C, STEINBERG -----

EXPERIMENT NAME- 20-KHZ TO 3-MHZ RADIO MAPPING

NSSDC ID- HELDCTR-10

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.L. STEINBERGPARIS OBSERVATORY
MEUDON, FRANCE
OI - P. COUTURIERPARIS OBSERVATORY
MEUDON, FRANCE
OI - R. KNOLLMEUDON OBS
PARIS, FRANCE
OI - J. FAINDERGNASA-GSFC
GREENBELT, MD
OI - R.G. STONENASA-GSFC
GREENBELT, MD
OI - S.R. MOSIERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF FOUR SELF-CALIBRATING RADIO METERS THAT STEP THROUGH 16 FREQUENCIES BETWEEN 20 KHZ AND 3 MHZ. THESE RADIO METERS ARE CONNECTED TO DIPOLE ANTENNAS. TYPE 3 SOLAR RADIO BURSTS WILL BE USED TO MAP MAGNETIC LINES OF FORCE IN AND OUT OF THE ECLIPTIC BETWEEN 0.05 AND 1 AU, THEREBY PRODUCING A THREE-DIMENSIONAL DESCRIPTION OF THE SOLAR WIND.

----- ISEE-C, STONE -----

EXPERIMENT NAME- COSMIC-RAY COMPOSITION

NSSDC ID- HELDCTR-12

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - E.C. STONECALIF INST OF TECH
PASADENA, CA
OI - H.E. VOGTCALIF INST OF TECH
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE ISOTOPIC CONSTITUTION OF SOLAR MATTER AND GALACTIC COSMIC-RAY SOURCES, THE PROCESSES OF NUCLEOSYNTHESIS IN THE SUN AND IN THE GALAXY, AND THE ASTROPHYSICAL PARTICLE ACCELERATION PROCESSES. THE FOLLOWING SPECIES ARE TO BE RESOLVED -- LITHIUM THROUGH NICKEL (L FROM 3 THROUGH 28 AND A FROM 6 THROUGH 64) IN THE ENERGY RANGE FROM 2 TO 200 MEV/NUCLEON. THE CORRESPONDING MASS

RESOLUTION IS 0.065 TO 0.083 PROTON MASS FOR LITHIUM, AND 0.18 TO 0.22 PROTON MASS FOR IRON. THE ISOTOPIC ABUNDANCES AND ENERGY SPECTRA WILL BE MEASURED BY A HEAVY ISOTOPE SPECTROMETER TELESCOPE THAT USES SOLID-STATE CHARGED PARTICLE DETECTORS. ANTICOINCIDENCE GUARD RINGS AND SOLID-STATE MATRIX MODESCOPE DETECTORS ARE EMPLOYED TO IMPROVE MASS AND ENERGY RESOLUTION.

----- ISEE-C, VON ROSENVING -----

EXPERIMENT NAME- SOLAR AND GALACTIC ENERGETIC PARTICLES

NSSDC ID- HELDCTR-04

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.T. VON ROSENVINGNASA-GSFC
GREENBELT, MD
OI - L.A. FISKNASA-GSFC
GREENBELT, MD
OI - F.B. McDONALDNASA-GSFC
GREENBELT, MD
OI - J.H. TRAINORNASA-GSFC
GREENBELT, MD
OI - M.A.I. VAN HOLLERKENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE COMPOSITION OF SOLAR COSMIC RAYS FROM HYDROGEN THROUGH IRON AND THE ELEMENTAL ABUNDANCE OF GALACTIC COSMIC RAYS. THREE PARTICLE TELESCOPES PLUS A PROPORTIONAL COUNTER, FOR MEASUREMENT OF ELECTRONS AND X RAYS, WILL COMPRIZE THE INSTRUMENTATION. NUCLEI WITH Z BETWEEN 1 AND 26 WILL BE MEASURED IN VARIOUS ENERGY WINDOWS IN THE RANGE 0.5-500 MEV PER NUCLEON. ISOTOPES IN THE Z RANGES 1 TO 2, 3 TO 7, AND 8 TO 16 WILL BE MEASURED IN THE ENERGY RANGES 4 TO 80, 8 TO 120, AND 10 TO 200 MEV PER NUCLEON, RESPECTIVELY. ELECTRONS WILL BE MEASURED IN THE ENERGY RANGES 0.07 TO 0.2 MEV AND 0.3 TO 12 MEV. ANISOTROPY INFORMATION WILL BE OBTAINED FOR THE ELECTRONS AND FOR 0.5-150 MEV/NUCLEON NUCLEI.

----- ISEE-C, WILCOX -----

EXPERIMENT NAME- SOLAR AND INTERPLANETARY MAGNETIC FIELDS
(CORRELATIVE STUDY)

NSSDC ID- HELDCTR-13

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. WILCOXSTANFORD U
STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THE MEASUREMENT OF LARGE SCALE SOLAR MAGNETIC AND VELOCITY FIELDS WITH THE STANFORD GROUND-BASED SOLAR TELESCOPE, AND THE COMPARISON OF THESE MEASUREMENTS WITH MEASUREMENTS OF THE INTERPLANETARY MAGNETIC FIELD AND SOLAR WIND MADE BY OTHER EXPERIMENTS ON THIS SPACECRAFT. THE PURPOSE OF THE EXPERIMENT WILL BE TO STUDY THE LARGE SCALE STRUCTURE OF THE SOLAR MAGNETIC FIELD AND ITS EXTENSION INTO INTERPLANETARY SPACE BY THE SOLAR WIND.

***** ISIS I *****

SPACECRAFT COMMON NAME- ISIS I
ALTERNATE NAMES- ISIS-A, 03669
NSSDC ID- 69-009A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/30/70.

LAUNCH DATE- 01/30/69 SPACECRAFT WEIGHT- 532. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
CANADA CRC
UNITED STATES NASA-DSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 01/30/69
ORBIT PERIOD- 126. MIN INCLINATION- 88.425 DEG
PERIAPSIS- 574.000 KM ALT APOAPSIS- 3522.00 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 09/07/73
ORBIT PERIOD- 126.21 MIN INCLINATION- 88.429 DEG
PERIAPSIS- 574.20 KM ALT APOAPSIS- 3514.80 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - L.H. GRACENASA-GSFC
GREENBELT, MD
PS - J.H. WHITTAKERCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

SPACECRAFT BRIEF DESCRIPTION

ISIS I WAS AN IONOSPHERIC OBSERVATORY INSTRUMENTED WITH SWEEP FREQUENCY AND FIXED FREQUENCY IONOSONDES, A VLF RECEIVER, ENERGETIC AND SOFT PARTICLE DETECTORS, AN ION MASS

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

SPECTROMETER, AN ELECTROSTATIC PROBE, AN ELECTROSTATIC ANALYZER, A BEACON TRANSMITTER, AND A COSMIC NOISE EXPERIMENT. THE SOUNDER USED TWO LONG DIPOLE ANTENNAS (70.9 AND 20.2 M LONG, RESPECTIVELY). THE SATELLITE WAS SPIN-STABILIZED AT ABOUT 2.9 RPM AFTER ANTENNA DEPLOYMENT. SOME CONTROL COULD BE EXERCISED OVER THE SPIN RATE AND ATTITUDE BY USING MAGNETICALLY INDUCED TORQUES TO CHANGE THE SPIN RATE AND TO PRECESS THE SPIN AXIS. A TAPE RECORDER WITH 1-HR CAPACITY WAS INCLUDED ON THE SATELLITE. THE SATELLITE COULD BE PROGRAMMED TO TAKE RECORDED OBSERVATIONS FOR FOUR DIFFERENT TIME PERIODS FOR EACH FULL RECORDING PERIOD. THE RECORDING WAS DUMPED ONLY AT JTFAMA. FOR NON-TAPE-RECORDED OBSERVATIONS, DATA FOR THE SATELLITE AND SUNSATTELE REGIONS COULD BE OBSERVED AND TELEMETRY STATIONS. THE SELECTED TELEMETRY STATIONS WERE IN AREAS THAT PROVIDED PRIMARY DATA COVERAGE NEAR THE 00-DEG W MERIDIAN, PLUS AREAS NEAR HAWAII, SINGAPORE, AUSTRALIA, ENGLAND, NORWAY, INDIA, JAPAN, ANTARCTICA, NEW ZEALAND, AND CENTRAL AFRICA. NO TAPE-RECORDED DATA WERE AVAILABLE AFTER JANUARY 30, 1970, BECAUSE OF FAILURE OF THE RECORDER. THE ION MASS SPECTROMETER FAILED ABOUT 3 DAYS AFTER LAUNCH. INITIALLY, 6 TO 9 HR OF OBSERVATIONS WERE MADE DAILY, BUT BY THE SPRING OF 1973, ONLY 4 TO 5 HR OF OBSERVATIONS PER DAY WERE BEING MADE. THE DECREASE IN OBSERVATION TIME WAS DUE TO A COMBINATION OF FUNDING AND POWER LIMITATIONS, AND SCHEDULING.

----- ISIS 1, BARRINGTON -----

EXPERIMENT NAME- VLF RECEIVER

NSSDC ID- 69-009A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/30/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.E. BARRINGTONCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - F.M. PALMERCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THE VLF EXPERIMENT WAS A LOW-FREQUENCY, BROADBAND RECEIVER THAT SENSED SIGNALS RECEIVED BY THE 70-M DIPOLE (SPLIT MONOPOLE) ANTENNA, BETWEEN .05 AND 30 KHZ. THIS SAME ANTENNA WAS USED FOR RECEIVING FREQUENCIES BELOW 5 KHZ ON THE IONOSPHERE. THE RECEIVER HAD A WIDE DYNAMIC RANGE (40 DB) THAT WAS ACHIEVED BY USE OF AN AUTOMATIC GAIN CONTROL SYSTEM. THIS VLF EXPERIMENT INCLUDED AN OPTIONAL-USE ONBOARD EXCITER THAT OPERATED OVER A FREQUENCY CYCLE FROM ZERO TO 3 TO ZERO TO ELEVEN TO ZERO KHZ OVER A 1.5-SEC FRAME PERIOD. THE TRANSMISSION AT 3 KHZ OCCURRED FOR ABOUT 2 SEC. THE NON-LINEAR SWEEP TO 11 KHZ REQUIRED 0.9 SEC. TRANSMISSION AT 11 KHZ FOR ABOUT 0.3 SEC, AND THE NON-LINEAR SWEEP BACK TO ZERO TOOK ABOUT 0.3 SEC. THE FRAMES SEQUENCED THROUGH FOUR STEPS WHERE THE TRANSMISSIONS WERE ATTENUATED BY ZERO, 20, 20, THEN 40 DB. THIS REQUIRING 14 SEC FOR ONE COMPLETE CYCLE OF EXCITER OPERATION. THE EXCITER TRANSMITTED ON THE SHORT ANTENNAS AND THE RECEIVER SENSED THE SIGNALS COUPLED BETWEEN THE TWO ANTENNAS BY THE AMBIENT PLASMA, PLUS ANY NOISE SIGNALS WHICH WERE EXCITED IN THE PLASMA. EXCITER OPERATION PERMITTED THE CONTROLLED STUDY OF ION RESONANCES IN ADDITION TO STUDY OF NATURAL AND OTHER MAN-MADE VLF RADIO NOISE. THIS VLF EXPERIMENT ALSO PERMITTED ANTENNA IMPEDANCE MEASUREMENTS, WITH OR WITHOUT A DC BIAS ON THE ANTENNA. THE REAL-TIME DATA WERE TRANSMITTED ON 136.00 MHZ TELEMETRY. THE VLF DATA COULD BE RECORDED ON ONE OF THE FOUR TAPE-RECORDER CHANNELS DURING THE TIME THE TAPE RECORDER OPERATED (TO JANUARY 1970). TAPE-RECORDED (AND BACK-UP REAL TIME) DATA WERE TRANSMITTED ON 400-MHZ TELEMETRY. FURTHER DETAILS CAN BE FOUND IN THE 'ISIS A TECHNICAL PLAN.'

----- ISIS 1, BRACE -----

EXPERIMENT NAME- CYLINDRICAL ELECTROSTATIC PROBE

NSSDC ID- 69-009A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/30/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - L.H. BRACENASA-GSFC
GREENBELT, MD
OI - J.A. FINDLAYNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO STUDY THE GLOBAL VARIATIONS OF ELECTRON TEMPERATURE AND ELECTRON CONCENTRATION AT SPACECRAFT (SC) ALTITUDES DURING SOLAR MAXIMUM, AND TO STUDY CHARACTERISTICS OF THE SC ION SHEATH. THIS CYLINDRICAL PROBE WAS A TYPE OF LANGMUIR PROBE THAT OBSERVED CURRENT FLOW FOR A GIVEN VOLTAGE PROFILE PLACED ON THE COLLECTOR. FROM THIS CURRENT-VOLTAGE PROFILE, THE ELECTRON DENSITY AND ELECTRON TEMPERATURE COULD BE CALCULATED. THERE WAS A BOOM PROBE AND AN AXIAL PROBE EXTENDING FROM THE SC. THE AXIAL PROBE EXTENDED 40.3 CM FROM THE SC, ALONG THE SPIN AXIS, AND WAS CENTERED AMONG THE FOUR TELEMETRY ANTENNAS ON THE UNDERSIDE OF THE SC. THIS PROBE WAS CAPABLE OF MEASUREMENTS UNDISTURBED BY THE SATELLITE MOTION ONLY WHEN THE PROBE PRECEDED THE SC IN ITS MOTION THROUGH THE PLASMA. THE BOOM PROBE EXTENDED HORIZONTALLY AND OUTWARD (IN SC FRAME OF REFERENCE) FROM A BOOM 1 M LONG, WHICH IN TURN EXTENDED FROM AN UPPER SURFACE OF

THE SATELLITE AT AN ANGLE OF ABOUT 45 DEG TO THE SPIN AXIS. THIS PROBE PROVIDED SOME OBSERVATIONS DURING EACH SC SPIN CYCLE THAT WAS FREE OF SC MAKE EFFECTS. THE PROBES CONSISTED OF THREE CONCENTRIC, ELECTRICALLY ISOLATED, STAINLESS STEEL TUBES. THE OUTER (10.24-CM DIAM AND 23-CM LONG) TUBE FLOATED AT ITS OWN EQUILIBRIUM POTENTIAL AND SERVED TO PLACE THE COLLECTOR WELL AWAY FROM THE SC PLASMA SHEATH. THE CENTER TUBE (0.105-CM DIAM) EXTENDING 23 CM OUTWARD FROM THE OUTER TUBE ACTED AS AN ELECTRICAL GUARD FOR THE COLLECTOR. ITS ELECTRICAL POTENTIAL WAS CONTROLLED. THE COLLECTOR (0.058-CM DIAM) EXTENDED 23 CM OUTWARD FROM THE DRIVEN GUARD. DURING EACH 2-MIN SEQUENCE, A VOLT-AMPERE CURVE WAS OBTAINED FROM THE SAWTOOTH VOLTAGE (-2 TO PLUS 10V) APPLIED TO THE COLLECTOR. THIS CAN BE INTERPRETED IN ELECTRON DENSITIES OVER A RANGE FROM 100 TO 1,500,000 ELECTRONS/CM³, AND TEMPERATURES FROM ABOUT 400 TO 50,000 DEG K.

----- ISIS 1, CALVERT -----

EXPERIMENT NAME- FIXED FREQUENCY SOUNDER

NSSDC ID- 69-009A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/30/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W. CALVERTNOAA-FRL
BOULDER, CO
OI - R.O. NORTONNOAA-FRL
BOULDER, CO
OI - J.M. WARMOCKNOAA-FRL
BOULDER, CO
OI - G.L. NELMSCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - G.E.K. LOCKWOODCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - J.H. WHITTEKERCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - C.E. PETRIECOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - T.E. VAN ZANDTNOAA-FRL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE FIXED FREQUENCY SOUNDER OPERATED FROM THE SAME ANTENNA, TRANSMITTER, AND RECEIVER USED FOR THE SWEEP FREQUENCY EXPERIMENT. IT NORMALLY OPERATED FOR 3 TO 5 SEC DURING THE FREQUENCY FLY-BACK PERIOD OF THE SWEEP FREQUENCY OPERATION WHICH WAS EVERY 19 OR 29 SEC. ONE OF SIX FREQUENCIES (0.25, 0.40, 1.00, 1.95, 4.00, OR 9.303 MHZ) WAS CHOSEN FOR USE BY THE EXPERIMENTER AS DESIRED. OTHER MODES OF OPERATION WERE AVAILABLE, INCLUDING CONTINUOUS OBSERVATION AT A SELECTED FREQUENCY, AND A SPECIAL MIXED MODE WITH TRANSMISSION AT THE FIXED FREQUENCY OF 0.62 MHZ AND SWEEP RECEPTION. THIS EXPERIMENT WAS DESIGNED TO STUDY IONOSPHERIC FEATURES OF A SMALLER SCALE THAN COULD BE DETECTED BY THE SWEEP SOUNDER, AND TO STUDY PLASMA RESONANCES. PARAMETERS MEASURED WERE VIRTUAL RANGE (A FUNCTION OF PROPAGATION TIME OF THE REFLECTED PULSE) AND TIME (A FUNCTION OF GEOGRAPHICAL POSITION). THESE DATA WERE NORMALLY OBSERVED ONLY WHEN THE SPACECRAFT WAS IN RANGE OF THE TELEMETRY STATION. A LIMITED AMOUNT OF DATA WAS TAPE RECORDED DURING THE FIRST YEAR AFTER LAUNCH.

----- ISIS 1, FORSYTH -----

EXPERIMENT NAME- RADIO BEACON

NSSDC ID- 69-009A-09

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/30/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P.A. FORSYTHWESTERN ONTARIO U
LONDON, ONTARIO, CANADA
OI - G.F. LYONWESTERN ONTARIO U
LONDON, ONTARIO, CANADA
OI - E.W. TULLWESTERN ONTARIO U
LONDON, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO STUDY THE IONOSPHERIC IRREGULARITIES GIVING SPECIAL ATTENTION TO THE DISTURBED IONOSPHERIC CONDITIONS. BEACON TRANSMITTERS ABOARD THE SATELLITE RADIATED POLARIZED RADIO EMISSIONS ON COMMAND, AT 136.41 AND 137.95 MHZ. THE SIGNAL POLARIZATION, THE AMPLITUDE OF THE SIGNAL, THE RELATIVE PHASE OF THE SIGNAL, AND THE INCIDENT DIRECTION OF THE SIGNAL WERE OBSERVED FROM GROUND STATIONS. COINCIDENT OBSERVATIONS WERE MADE AT STATIONS ABOUT 100 WAVELENGTHS APART. FROM KNOWN SPACECRAFT POSITION INFORMATION AND THESE OBSERVATIONS, IONOSPHERIC IRREGULARITIES COULD BE ALMOST COMPLETELY DESCRIBED IN TERMS OF HEIGHT, HORIZONTAL SIZE AND SHAPE, ELECTRON PEAK CONCENTRATION, AND RADIAL DISTRIBUTION OF ELECTRONS. AN IMPORTANT PART OF THESE DESCRIPTIONS WAS TO ORIGINATE FROM THE COMPUTED VALUES OF TOTAL ELECTRON CONTENT (TEC) OBTAINED PRIMARILY FROM THE POLARIZATION AND PHASE OBSERVATIONS. THE BEACON HAS BEEN OPERABLE SINCE LAUNCH, BUT IT HAS BEEN IMPRACTICAL TO OBTAIN TEC MEASUREMENTS DUE TO POOR CHARACTERISTICS OF THE BEACON ANTENNA RADIATION PATTERN. USEFUL DATA HAVE BEEN OBTAINED FROM THE INCIDENT DIRECTION, PHASE, AND AMPLITUDE MEASUREMENTS. REFERENCE 'ISIS TECHNICAL PLAN,' PP. 84, 85 FOR FURTHER DETAILS.

----- ISIS 1, HARTZ -----

EXPERIMENT NAME- COSMIC RADIO NOISE

NSSDC ID- 69-009A-10

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/30/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - T.W. HARTZCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED THE SWEEP-FREQUENCY IONOSPHERE
RECEIVER AUTOMATIC GAIN CONTROL VOLTAGE TO MEASURE GALACTIC
AND SOLAR RADIO NOISE LEVELS. THE RECEIVER SWEEP FROM 0.1
TO 20 MHZ. THE DYNAMIC RANGE WAS 50 DB, AND THE BANDWIDTH WAS 55
KHZ. THE ANTENNAS USED WERE 18.75-M AND 73.15-M DIPOLES.

----- ISIS 1, MCDIARMID -----

EXPERIMENT NAME- ENERGY PARTICLE DETECTORS

NSSDC ID- 69-009A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/30/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - L.H. MCDIARMIDNATL RES COUNCIL OF CAN
OTTAWA, ONTARIO, CANADA

DI - J.W. BURNHAMNATL RES COUNCIL OF CAN
OTTAWA, ONTARIO, CANADA
DI - R.C. ROSENATL RES COUNCIL OF CAN
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF FOUR SETS OF DETECTORS. THE
FIRST SET, COMPRISING FOUR GEIGER COUNTERS, MEASURED ELECTRONS
GREATER THAN 20 AND 40 KEV AND PROTONS GREATER THAN 300 AND
500 KEV PARALLEL AND PERPENDICULAR TO THE SATELLITE SPIN AXIS.
ALL REMAINING DETECTORS MEASURED PARTICLES PERPENDICULAR TO
THE SPIN AXIS. THE SECOND SET CONSISTED OF SOLID-STATE SILICON
JUNCTION DETECTORS. THESE RESPONDED TO ELECTRONS GREATER THAN
25 AND 140 KEV, ELECTRONS IN THE RANGE 200 TO 770 KEV, AND
PROTONS GREATER THAN 200 AND 400 KEV. THE THIRD SET CONSISTED
OF 5 SILICON JUNCTION DETECTORS WHICH RESPONDED TO PROTONS
BETWEEN 0.15 AND 30 MEV. THE FOURTH SET CONSISTED OF CESIUM
IODIDE SCINTILLATION-PHOTOMULTIPLIER SYSTEMS. EACH SYSTEM
OPERATED IN TWO MODES, AND RESPONDED TO ELECTRONS GREATER THAN
8, 40, AND 80 KEV AND PROTONS GREATER THAN 50 KEV AND IN THE
RANGE 50 TO 70 KEV.

----- ISIS 1, SAGALYN -----

EXPERIMENT NAME- SPHERICAL ELECTROSTATIC ANALYZER

NSSDC ID- 69-009A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/30/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.C. SAGALYNUSAF CAMBRIDGE RES LAB
BEDFORD, MA
DI - W. SHIPPYUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THE SPHERICAL ELECTROSTATIC ANALYZER
(SEEA) EXPERIMENT WAS TO MEASURE THE TEMPORAL AND SPATIAL
VARIATIONS IN THE CONCENTRATIONS AND ENERGY DISTRIBUTION OF
THE CHARGED PARTICLES THROUGHOUT THE ORBIT. SPECIFICALLY, THE
OBJECTIVES WERE TO MEASURE THE FOLLOWING PARAMETERS -- (A) THE
DENSITY OF POSITIVE IONS HAVING THERMAL ENERGY IN THE
CONCENTRATION RANGE FROM 1.1 TO 16 IONS PER CUBIC CENTIMETER
(LOGARITHMIC AMPLIFIERS WERE USED IN THE INPUT CIRCUIT), (B)
THE KINETIC TEMPERATURE OF THE THERMAL IONS IN THE RANGE FROM
700 TO 4000 DEG K, (C) THE FLUX AND ENERGY SPECTRUM OF PROTONS
IN THE RANGE FROM 0 TO 3 KEV, AND (D) THE SATELLITE POTENTIAL
WITH RESPECT TO THE UNDISTURBED PLASMA. TWO UNITS, MADE UP OF THE
EXPERIMENT PACKAGE -- A 30-CM HOOD THAT SUPPORTED THE SENSOR
AND MADE POSSIBLE OMNIDIRECTIONAL MEASUREMENTS, AND AN
ELECTRONIC PACKAGE (CONSIDERED TO INCLUDE THE SENSOR) TO
PERFORM THE MEASUREMENTS AND TO PROCESS THE DATA INTO A
SUITABLE FORM FOR TELEMETRY. THE SENSOR WAS MADE UP OF THREE
CONCENTRIC SPHERICAL MESHES GRIDS, HAVING RADII OF 3.10, 2.84
AND 1.00 CM. THE INNERMOST GRID WAS THE COLLECTOR. THESE
GRIDS WERE MADE FROM TUNGSTEN MESH AND HAD A TRANSPARENCY OF
80 TO 90 PERCENT. TO MEASURE THE PARAMETERS LISTED ABOVE,
SUITABLE SWEEP AND STEP VOLTAGES WERE APPLIED TO THE GRIDS.
THIS INSTRUMENT WAS OPERATED IN SEVERAL MODES. THE ION
DENSITIES WERE SAMPLED SIXTY TIMES A SECOND, CORRESPONDING TO
A SPATIAL RESOLUTION OF 150 METERS. ONCE PER MINUTE THE RATIO
OF MASS TO TEMPERATURE WAS SAMPLED, AND THE ENERGY
DISTRIBUTION WAS SAMPLED ONCE EVERY TWO MINUTES.

----- ISIS 1, WHITTEKER -----

EXPERIMENT NAME- SWEEP FREQUENCY SOUNDER

NSSDC ID- 69-009A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/30/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. WHITTEKERCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
DI - G.E. KLOCKWOODCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
DI - G.L. NELMSCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
DI - J.E. JACKSONNASA-GSFC
GREENBELT, MD
DI - J.W. KINGAPPLETON LAB
SLOUGH, BUCKS, ENGLAND
DI - J. TURNERAUSTRALIAN DEPT OF INTERIOR
SYDNEY, AUSTRALIA
DI - M. SYLVAINIONOSPHERIC RES GROUP
ORLANS, FRANCE
DI - D. MOLTAURORA OBS
TROMSO, NORWAY
DI - Y. OGATARADIO RESEARCH LAB
TOKYO, JAPAN
DI - R. RAGHAVARAOPHYSICAL RESEARCH LAB
AHMEDABAD, INDIA
DI - W. CALVERTNOAA-FRL
BOULDER, CO
DI - T.E. VAN ZANDTNOAA-FRL
BOULDER, CO
DI - L. COLINNASA-ARC
MOFFETT FIELD, CA
DI - R.B. NORTONNOAA-FRL
BOULDER, CO
DI - C.E. PETRIECOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THE ISIS 1 IONOSPHERE WAS A RADIO TRANSMITTER/RECEIVER
THAT RECORDED THE TIME DELAY BETWEEN A TRANSMITTED AND A
RETURNED RADIO FREQUENCY PULSE. A CONTINUUM OF FREQUENCIES
BETWEEN 0.1 AND 20 MHZ WAS SAMPLED ONCE EVERY 19 OR 29 SEC.
AND ONE OF SIX SELECTED FREQUENCIES WAS ALSO SOUNDED FOR A
PERIOD OF 3 TO 5 SEC DURING THIS 19- OR 29-SEC PERIOD. IN
ADDITION TO THE SWEEP AND FIXED FREQUENCY MODES OF OPERATION,
A MIXED MODE WAS POSSIBLE WHERE THE TRANSMITTER FREQUENCY WAS
FIXED AT 0.02 MHZ WHILE THE RECEIVER SWEEP. SEVERAL VIRTUAL
HEIGHT (DELAY TIME) TRACES WERE NORMALLY OBSERVED DUE TO
GROUND REFLECTIONS, PLASMA RESONANCES, DIFFRACCTION OF THE
IONOSPHERE, NON-VERTICAL PROPAGATION, ETC. VIRTUAL HEIGHT AT A
GIVEN FREQUENCY WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED
BY THE SIGNAL. ELECTRON DENSITY ALONG THE PROPAGATION PATH,
AND MODE OF PROPAGATION. THE STANDARD DATA FORM WAS AN
IONOGRAM SHOWING VIRTUAL HEIGHT AS A FUNCTION OF FREQUENCY.
TWO OTHER FORMS OF DATA WERE COMMONLY PREPARED FROM THE
IONOGRAMS. THEY WERE DIGITAL FREQUENCY AND/OR VIRTUAL HEIGHT
VALUES OF CHARACTERISTIC IONOSPHERIC FEATURES AND COMPUTATIONS
OF ELECTRON DENSITY PROFILES.

***** ISIS 2 *****

SPACECRAFT COMMON NAME- ISIS 2

ALTERNATE NAMES- ISIS-B, PL-701P
05104

NSSDC ID- 71-024A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/04/73.

LAUNCH DATE- 04/01/71 SPACECRAFT WEIGHT- 570. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY

CANADA CRC
UNITED STATES NASA-DSS

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 04/01/71
ORBIT PERIOD- 113.61 MIN INCLINATION- 08.1564 DEG
PERIAPSIS- 1367. KM ALT APRAPSIS- 1429. KM ALT

RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 09/07/73
ORBIT PERIOD- 113.65 MIN INCLINATION- 08.101 DEG
PERIAPSIS- 1354.33 KM ALT APRAPSIS- 1424.39 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - L.H. BRACENASA-GSFC
GREENBELT, MD
PS - J.H. WHITTEKERCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

SPACECRAFT BRIEF DESCRIPTION

ISIS 2 WAS AN IONOSPHERIC OBSERVATORY INSTRUMENTED WITH
A SWEEP FREQUENCY AND A FIXED FREQUENCY IONOSPHERE, A VLF
RECEIVER, ENERGY AND SPECTRA PARTICLE DETECTORS, AN ION MASS
SPECTROMETER, AN ELECTROSTATIC PROBE, A REFLECTING POTENTIAL
ANALYZER, A BEACON TRANSMITTER, A COSMIC NOISE EXPERIMENT, AND
TWO PHOTOMETERS. THE SOUNDER USED TWO LONG CROSSED-DIPOLE
ANTENNAS (70.9 M AND 20.2 M LONG, RESPECTIVELY) FOR THE
SOUNDING. VLF, AND COSMIC NOISE EXPERIMENTS. THE SPACECRAFT
WAS NOMINALLY SPIN STABILIZED WITH SPIN AXIS IN THE ORBIT
PLANE TO ABOUT 2 RPM AFTER ANTENNA DEPLOYMENT. A CARTWHEEL
MODE WITH THE AXIS PERPENDICULAR TO THE ORBIT PLANE WAS MADE
AVAILABLE OCCASIONALLY FOR PERIODS OF A FEW MONTHS. THIS WAS
DONE TO PROVIDE RAM AND WAKE DATA FOR SOME EXPERIMENTS EACH

SPIN PERIOD RATHER THAN EACH ORBIT PERIOD. ATTITUDE AND SPIN INFORMATION WAS OBTAINED FROM A THREE-AXIS MAGNETOMETER AND A SUN SENSOR. CONTROL OF ATTITUDE AND SPIN WAS POSSIBLE BY MEANS OF MAGNETIC TORQUING. THE EXPERIMENT PACKAGE ALSO INCLUDED A PROGRAMMABLE TAPE RECORDER WITH A 1-HR CAPACITY. FOR NON-RECORDED OBSERVATIONS, DATA FROM SATELLITE AND SUBSATELLITE LOCATIONS WERE TELEMETRED WHEN THE SPACECRAFT WAS IN LINE OF SIGHT OF A TELEMETRY STATION. TELEMETRY STATIONS WERE LOCATED SO THAT PRIMARY DATA COVERAGE WAS NEAR THE 00-DEG W MERIDIAN AND NEAR HAWAII, SINGAPORE, AUSTRALIA, ENGLAND, FRANCE, NORWAY, INDIA, JAPAN, ANTARCTICA, NEW ZEALAND, AND CENTRAL AFRICA. INITIAL OPERATION OF ALL EXPERIMENTS WAS NOMINAL. THE TAPE RECORDERS FAILED ON FEBRUARY 4, 1972, BUT REAL-TIME OBSERVATIONS CONTINUED TO BE TELEMETRED TO GROUND STATIONS. AFTER APRIL 1973, DATA TAKEN WERE TO BE STORED ON TAPE FOR AT LEAST 10 MONTHS. THESE DATA TAPES MAY BE ERASED FOR REUSE IF SO REQUIREMENT (AND FUNDING) FOR DATA REDUCTION OCCURS WITHIN THAT PERIOD. SATELLITE OPERATION OCCURRED (JUNE 1974) FOR ABOUT 5 HOURS PER DAY.

----- ISIS 2, ANGER -----

EXPERIMENT NAME- 3914- TO 3977-A PHOTOMETER

NSSDC ID- 71-024A-11

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/04/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.D. ANGERU OF CALGARY
EDMONTON, ALBERTA, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS DUAL WAVELENGTH SCANNING AURORAL PHOTOMETER WAS DESIGNED TO MAP THE DISTRIBUTION OF AURORAL EMISSIONS AT 3977 AND 3914 Å OVER THE PORTION OF THE DARK EARTH VISIBLE TO THE SPACECRAFT. A COMBINATION OF INTERNAL ELECTRONIC SCANNING PERFORMED BY AN IMAGE DISSECTOR AND OF THE NATURAL ORBITAL AND ROTATIONAL MOTIONS OF THE SPACECRAFT PERMITTED THE SENSOR TO SYSTEMATICALLY SCAN ACROSS THE EARTH. THE DETECTOR SYSTEM WAS CONSTRUCTED TO ALLOW INCIDENT RADIATION TO BE ACCEPTED FROM TWO DIRECTIONS 100 DEG APART AND THEN TO FOCUS THIS LIGHT AT A COMMON POINT ON THE SINGLE IMAGE DISSECTOR PHOTOMETER TUBE. FOR EACH DIRECTION, THE LIGHT PASSED THROUGH ITS OWN LENS, INTERFERENCE FILTER, AND MIRROR. ONE FILTER OPERATED IN THE RANGE 5501 PLUS OR MINUS 9 Å (AT THE HALF-MAXIMUM POINTS), AND THE OTHER FILTER OPERATED AT 3915 PLUS OR MINUS 13 Å. ONLY ONE OF THE TWO OPTICAL SYSTEMS PRINTED AT THE EARTH AT ANY ONE TIME, WHILE THE OTHER FACED INTO SPACE. WHEN THE SPACECRAFT SPIN AXIS WAS ORIENTED TO LIE IN THE ORBITAL PLANE, EACH ROTATION OF THE SPACECRAFT RESULTED IN AN EARTH SCAN 5 DEG WIDE. THIS WIDTH SIZE WAS CHOSEN TO INSURE OVERLAP WITH THE PREVIOUS SCAN. THE IMAGE DISSECTOR REPEATIVELY SCANNED AT A HIGH SPEED ACROSS THE NARROW DIMENSION OF EACH 5-DEG BAND AND DIVIDED IT INTO SEPARATELY RESOLVED REGIONS 0.4 DEG BY 0.4 DEG. SIMILAR STRIPS WERE SCANNED AT EACH OF THE TWO WAVELENGTHS, BUT AT TIMES THAT DIFFERED BY HALF THE ROTATION PERIOD OF ABOUT 10 SEC. A CALIBRATION LIGHT SOURCE FOR EACH WAVELENGTH WAS BUILT INTO THE OPTICAL ASSEMBLY, AND A CALIBRATE CYCLE WAS INITIATED AUTOMATICALLY WHENEVER A 'POWER ON' COMMAND WAS GIVEN. TO MINIMIZE THE PROBLEMS ARISING FROM SOLAR ILLUMINATION OF THE OPTICS AND THE DIRECT VIEWING OF THE SUNLIT EARTH, A SUNLIGHT PROTECTION SYSTEM WAS INCLUDED. THE ELECTRONIC PORTION OF THE INSTRUMENT CONSISTED OF MODULES THAT AMPLIFIED AND COUNTED OUTPUT PULSES FROM THE IMAGE DISSECTOR TUBE AND CONVERTED THESE INTO A HIGH-RATE PULSE CODE MODULATED OUTPUT AND A LOW-RATE ANALOG OUTPUT. THE DATA WILL BE REPRODUCED DIRECTLY IN THE FORM OF SEPARATE PICTURES REPRESENTING EMISSIONS AT EACH WAVELENGTH, WHICH WILL BE USED TO STUDY THE LARGE-SCALE DISTRIBUTION AND MORPHOLOGY OF AURORAS AND TO COMPARE WITH OTHER MEASUREMENTS FROM THIS AND OTHER SPACECRAFT AND FROM GROUND-BASED INSTRUMENTS. COMPLETE DETAILS ABOUT THE EXPERIMENT CAN BE FOUND IN THE REPORT 'THE ISIS-2 SCANNING AURORAL PHOTOMETER,' C. D. ANGER, T. PANCOTT, J. McNALLY, AND H. S. KEHR, APPLIED OPTICS, VOL 12, NO. 8, PP. 1753-1766, AUGUST (1973).

----- ISIS 2, BARRINGTON -----

EXPERIMENT NAME- VLF RECEIVER

NSSDC ID- 71-024A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/04/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.E. BARRINGTONCOMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - F.H. PALMERCOMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THE VERY LOW-FREQUENCY (VLF) EXPERIMENT WAS A LOW-FREQUENCY (LF) BROADBAND RECEIVER THAT OBSERVED SIGNALS FROM THE 79-M LONG DIPOLE (SPLIT MONOPOLE) ANTENNA BETWEEN 405 AND 30 KHZ. THIS SAME ANTENNA WAS USED FOR RECEIVING SIGNALS BELOW 5 KHZ ON THE IONOSPHERE. THE VLF RECEIVER HAD A WIDE DYNAMIC RANGE THAT WAS ACHIEVED BY USE OF AN AUTOMATIC GAIN CONTROL (AGC) SYSTEM. THIS VLF EXPERIMENT INCLUDED AN ONBOARD EXCITER THAT SWEEP AT A NONLINEAR RATE FROM 50 TO ZERO HZ, THEN TO 9500 HZ, OVER A PERIOD OF 1.0 SEC. THIS PERMITTED THE CONTROLLED STUDY OF ION RESONANCES STIMULATED BY THE EXCITER.

IN ADDITION TO STUDY OF NATURAL AND OTHER MAN-MADE VLF RADIO NOISE, THE EXPERIMENT ALSO PERMITTED ANTENNA IMPEDANCE MEASUREMENTS, WITH OR WITHOUT A DC BIAS ON THE ANTENNA. THE REAL-TIME DATA WERE TRANSMITTED ON 135.08-MHZ TELEMETRY. THE VLF DATA COULD BE RECORDED ON ONE OF THE FOUR TAPE RECORDER CHANNELS FOR THE FIRST YEAR WHEN THE SPACECRAFT TAPE RECORDER WAS OPERATING. TAPE RECORDED (AND BACKUP REAL-TIME CAPABILITY) DATA WERE TRANSMITTED ON 400-MHZ TELEMETRY.

----- ISIS 2, BRACE -----

EXPERIMENT NAME- CYLINDRICAL ELECTROSTATIC PROBE

NSSDC ID- 71-024A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/04/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - L.H. BRACENASA-GSFC
GREENBELT, MD
OI - J.A. FINDLAYNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO STUDY THE GLOBAL VARIATIONS OF ELECTRON TEMPERATURE AND ELECTRON CONCENTRATION AT SPACECRAFT (SC) ALTITUDES DURING SOLAR MAXIMUM, AND TO STUDY CHARACTERISTICS OF THE SC ION SHEATH. THIS CYLINDRICAL PROBE WAS A TYPE OF LANGMUIR PROBE THAT OBSERVED CURRENT FLOW TO THE PROBE FOR A GIVEN VOLTAGE PROFILE PLACED ON THE COLLECTOR. FROM THIS CURRENT-VOLTAGE PROFILE, ELECTRON DENSITY AND ELECTRON TEMPERATURE COULD BE CALCULATED. THERE WAS A BOOM PROBE AND AN AXIAL PROBE EXTENDING FROM THE SC. THE AXIAL PROBE EXTENDED 40.3 CM FROM THE SC, ALONG THE SPIN AXIS, AND WAS CENTERED BETWEEN THE FOUR TELEMETRY ANTENNAS ON THE UNDERSIDE OF THE SC. THIS PROBE WAS CAPABLE OF MEASUREMENTS UNPERTURBED BY THE SATELLITE MOTION ONLY WHEN THE PROBE PRECEDED THE SC IN ITS MOTION THROUGH THE PLASMA. THE BOOM PROBE EXTENDED HORIZONTALLY AND OUTWARD IN SC FRAME OF REFERENCE) FROM A BOOM 1 M LONG, WHICH IN TURN EXTENDED FROM AN UPPER SURFACE OF THE SATELLITE AT AN ANGLE OF ABOUT 45 DEG TO THE SPIN AXIS. THIS PROBE PROVIDED SOME OBSERVATIONS DURING EACH SC SPIN CYCLE, WHICH WERE FREE OF SC WAKE EFFECTS. THE PROBES CONSISTED OF THREE CONCENTRIC, ELECTRICALLY ISOLATED, STAINLESS STEEL TUBES. THE OUTER (0.24 CM IN DIAM AND 23 CM LONG) TUBE FLOATED AT ITS OWN EQUILIBRIUM POTENTIAL AND SERVED TO PLACE THE COLLECTOR WELL AWAY FROM THE SC PLASMA SHEATH. THE CENTER TUBE (0.165-CM DIAM) EXTENDING 2.3 CM OUTWARD FROM THE OUTER TUBE ACTED AS AN ELECTRICAL GUARD FOR THE COLLECTOR. ITS ELECTRICAL POTENTIAL WAS CONTROLLED. THE COLLECTOR (0.058-CM DIAM) EXTENDED 23 CM OUTWARD FROM THE DRIVEN GUARD. DURING EACH 2-MIN SEQUENCE, A VOLT-AMPERE CURVE WAS OBTAINED THAT CAN BE INTERPRETED IN ELECTRON DENSITIES OVER A RANGE FROM 100 TO 1,500,000 ELECTRONS PER CM³, AND IN TEMPERATURE VALUES FROM 400 TO 50,000 DEG K.

----- ISIS 2, CALVERT -----

EXPERIMENT NAME- FIXED FREQUENCY SOUNDER

NSSDC ID- 71-024A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/04/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - W. CALVERTNDAA-ERL
BOULDER, CO

OI - R.D. NORTONNDAA-ERL
BOULDER, CO
OI - G.L. NELMSCOMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - C.E. PETRIECOMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - G.E.K. LOCKWOODCOMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - J.H. WHITTEKERCOMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - J.M. WARDNOCKNDAA-ERL
BOULDER, CO
OI - T.F. VAN ZANDTNDAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE FIXED FREQUENCY SOUNDER OPERATED FROM THE SAME ANTENNA, TRANSMITTER, AND RECEIVER USED FOR THE SWEEP FREQUENCY EXPERIMENT. IT NORMALLY OPERATED FOR 3 TO 5 SEC DURING THE FREQUENCY FLY-BACK PERIOD OF THE SWEEP FREQUENCY OPERATION WHICH WAS EVERY 14 OR 21 SEC. ONE OF SIX FREQUENCIES (0.12, 0.40, 1.00, 1.95, 4.00, OR 9.00 KHZ) WAS CHOSEN FOR USE BY THE EXPERIMENTER, AS DESIRED. OTHER MODES OF OPERATION WERE AVAILABLE INCLUDING CONTINUOUS OBSERVATION AT A SELECTED FREQUENCY AND A SPECIAL MIXED MODE WITH TRANSMISSION AT A SELECTED ONE OF THE SIX FIXED FREQUENCIES AND SWEEP RECEPTION. THIS EXPERIMENT WAS DESIGNED TO STUDY IONOSPHERIC FEATURES OF A SMALLER SCALE THAN COULD BE DETECTED BY THE SWEEP SOUNDER, AND TO STUDY PLASMA RESONANCES. PARAMETERS MEASURED WERE VERTICAL RANGE (A FUNCTION OF GEOGRAPHICAL POSITION), THESE DATA AND TIME (A FUNCTION OF GEOGRAPHICAL POSITION). THESE DATA WERE NORMALLY OBSERVED ONLY WHEN THE SPACECRAFT WAS IN RANGE OF THE TELEMETRY STATION. A LIMITED AMOUNT OF DATA WAS TAPE RECORDED DURING THE FIRST 2 YEARS AFTER LAUNCH.

----- ISIS 2, FORSYTH -----

EXPERIMENT NAME- RADIO BEACON

NSSDC ID- 71-024A-09

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 04/23/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P.A. FORSYTH WESTERN ONTARIO U
LONDON, ONTARIO, CANADA
OI - G.P. LYON WESTERN ONTARIO U
LONDON, ONTARIO, CANADA
OI - E.H. TULL WESTERN ONTARIO U
LONDON, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

A CW TRANSMITTER (137 TO 138 MHZ BAND) RADIATING ABOUT 100 MW AND OPERATING IN CONJUNCTION WITH TRACKING BEACON (136 TO 137 MHZ BAND) PROVIDED FACILITIES FOR OBSERVING SCINTILLATIONS FROM IRREGULARITIES, DETERMINING MAGNITUDES AND POSITIONS, AND EVALUATING ELECTRON CONTENT BETWEEN GROUND OBSERVER AND SATELLITE. INTERFERENCE DIFFICULTIES WITH OTHER SPACECRAFT OPERATIONS PREVENTED NOMINAL ELECTRON CONTENT DATA FROM BEING OBTAINED, HOWEVER SOME LIMITED AMOUNT OF USEFUL SCINTILLATION DATA WAS OBSERVED.

----- ISIS 2, HARTZ -----

EXPERIMENT NAME- COSMIC RADIO NOISE

NSSDC ID- 71-024A-10

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/04/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.H. HARTZ COMMUN RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED THE SWEEP FREQUENCY IONOSPHERE RECEIVER AUTOMATIC GAIN CONTROL (AGC) VOLTAGES TO MEASURE GALACTIC AND SOLAR RADIO NOISE LEVELS. THE RECEIVER SWEEP FROM 0.1 TO 23 MHZ. THE DYNAMIC RANGE WAS 50 DB. AND THE BANDWIDTH WAS 50 KHZ. THE ANTENNAS USED WERE 20.2-M AND 70.9-M DIPOLES.

----- ISIS 2, HEIKKILA -----

EXPERIMENT NAME- SOFT-PARTICLE SPECTROMETER

NSSDC ID- 71-024A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 02/04/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.J. HEIKKILA U OF TEXAS, DALLAS
DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

THE SOFT PARTICLE SPECTROMETER (WHICH WAS BASICALLY AN ELECTROSTATIC ANALYZER) WAS USED TO STUDY THE DIRECTIONAL INTENSITY AND DIFFERENTIAL ENERGY SPECTRA OF PROTONS AND ELECTRONS TO OBTAIN A GREATER UNDERSTANDING OF AURORAS, GEOMAGNETIC DISTURBANCES, AND VARIOUS IONOSPHERIC FEATURES. DIFFERENTIAL ENERGY SPECTRA WERE OBTAINED IN THE ENERGY RANGE 10 EV TO 10 KEV WITH A 20 PERCENT ENERGY RESOLUTION. THE VOLTAGE SWEEP PROGRAM OF THE ANALYZER WAS FLEXIBLE.

----- ISIS 2, HOFFMAN -----

EXPERIMENT NAME- ION MASS SPECTROMETER

NSSDC ID- 71-024A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/04/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. HOFFMAN U OF TEXAS, DALLAS
DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

THIS MAGNETIC ION MASS SPECTROMETER EXPERIMENT WAS FLOWN TO MEASURE THE DISTRIBUTION OF THE CONCENTRATIONS OF THE ION SPECIES AS A FUNCTION OF TIME AND POSITION. WITH PARTICULAR INTEREST FOCUSED ON THE SOLAR WIND PARTICLES. THE INSTRUMENT HAD TWO ION DETECTION SYSTEMS, AND MASS SCANNING THROUGH THE RANGE FROM 1 TO 64 AMU WAS ACCOMPLISHED IN TWO SECTIONS -- 1 TO 8 AMU AND 8 TO 64 AMU. TWO ION BEAMS EMERGED FROM THE MAGNETIC SECTION OF THE INSTRUMENT AND WERE SIMULTANEOUSLY DETECTED BY ELECTRON MULTIPLIERS AND LOG ELECTROMETER AMPLIFIERS. A CIRCUIT FOLLOWING EACH AMPLIFIER DETECTED THE PEAK AMPLITUDE OF THE ION CURRENT. THIS PEAK VALUE, RATHER THAN THE ENTIRE MASS SPECTRUM, WAS TRANSMITTED IN ORDER TO REDUCE THE REQUIRED TELEMETRY BANDWIDTH. IN THIS MODE OF OPERATION, THE COMPLETE MASS RANGE WAS SCANNED IN 1 SEC. A BACKUP MODE WAS PROVIDED WHICH PRODUCED AN ANALOG OUTPUT WITH A SWEEP PERIOD OF 4 SEC. THIS EXPERIMENT OPERATED NOMINALLY AFTER LAUNCH WITH MOST OF THE DATA OBTAINED IN THE PEAK MODE. FOR ABOUT 2 MIN PER PASS OVER OTTAWA, CANADA. THE EXPERIMENT OPERATED IN THE ANALOG MODE. INFLIGHT CALIBRATION WAS ACHIEVED

BY COMPARING ION CONCENTRATION MEASUREMENTS AT APPROPRIATE ALTITUDES, I.E., WHERE A SINGLE ION SPECIES PREDOMINATED, WITH ELECTRON DATA FROM THE SOUNDER ON BOARD. OTHER COMPARISONS WERE MADE BETWEEN THE SPECTROMETER OUTPUT AND MEASUREMENTS OBTAINED FROM OTHER RELATED EXPERIMENTS ON BOARD.

----- ISIS 2, HAIR -----

EXPERIMENT NAME- RETARDING POTENTIAL ANALYZER

NSSDC ID- 71-024A-08

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/04/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - E.J.R. HAIR NASA-GSFC
GREENBELT, MD
OI - M. SWIDDY USAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - B.E. TROY, JR. NASA-GSFC
GREENBELT, MD
OI - J.L. DONLEY NASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT MEASURED ION AND/OR ELECTRON CURRENT IN ORDER TO STUDY HEAT TRANSFER PROCESSES WHICH ARE IMPORTANT IN THE DYNAMICS OF THE IONOSPHERE. THIS RETARDING POTENTIAL ANALYZER CONSISTED OF THREE GRIDS (APERTURE GRID, RETARDING GRID AND A SUPPRESSOR GRID) WHICH PROVIDED A VOLT-AMPERE CURVE RELATING SWEEP VOLTAGE ON THE RETARDING GRID TO CURRENT FLOW TO THE COLLECTOR. ANALYSIS OF THE CURVES COULD PROVIDE ION/ELECTRON TEMPERATURES AND DENSITIES.

----- ISIS 2, MCDIARMID -----

EXPERIMENT NAME- ENERGETIC PARTICLE DETECTORS

NSSDC ID- 71-024A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 02/04/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - I.R. MCDIARMID NATL RES COUNCIL OF CAN
OTTAWA, ONTARIO, CANADA
OI - J.R. MURROWS NATL RES COUNCIL OF CAN
OTTAWA, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF FOUR SETS OF DETECTORS. THE FIRST DETECTOR CONSISTED OF THREE GEIGER COUNTERS (OF WHICH ONE FAILED RIGHT AFTER LAUNCH) AND MEASURED ELECTRONS GREATER THAN 20 AND 40 KEV PERPENDICULAR AND PARALLEL TO THE SPIN AXIS. THESE GEIGERS WERE ALSO SENSITIVE TO PROTONS WITH ENERGIES GREATER THAN 240 AND 600 KEV, RESPECTIVELY. ALL REMAINING DETECTORS MEASURED PARTICLES PERPENDICULAR TO THE SPIN AXIS. THE TWO GEIGER COUNTERS WERE CORRECTED FOR SATURATION AND DEADTIME. ALL OTHER COUNTERS FOR DEADTIME ONLY. THE SECOND SET CONSISTED OF TWO SOLID-STATE SILICON JUNCTION DETECTORS. BOTH WERE OPERATED IN LOW AND HIGH THRESHOLD MODE, WHILE ONE COULD ADDITIONALLY BE SWITCHED TO ANOTHER DISCRIMINATION LEVEL. THEY MEASURED ELECTRONS WITH ENERGIES GREATER THAN 40, 60, 90, 120, 150, AND 200 KEV. THEY WERE ALSO SENSITIVE TO PROTONS WITH ENERGIES GREATER THAN 180, 200, AND 750 KEV. THE SWITCHABLE DETECTOR EXPERIENCED CONTINUOUS SATURATION. THE THIRD SET CONSISTED OF THREE SILICON JUNCTION DETECTORS THAT MEASURED PROTONS IN THE ENERGY RANGES 0.8 - 8.0, 3.2 - 12.7, AND 12.9 - 20.0 MEV, ALPHA PARTICLES IN THE ENERGY RANGE 2.5 - 16.0 MEV, AND ELECTRONS IN THE ENERGY RANGE 1.0 - 2.0 MEV. THE FOURTH SET WAS COMPOSED OF TWO CESIUM IODIDE SCINTILLATION - PHOTOMULTIPLIER SYSTEMS (CHANNELTRONS WITH CYLINDRICAL ELECTROSTATIC ANALYZERS) STEPPED THROUGH EIGHT ENERGIES IN 64/60 OF A SECOND. THESE DIFFERENTIAL SPECTROMETERS MEASURED ELECTRONS AT 0.6, 7.0, 6.0, 4.1, 3.0, 2.2, 1.3, 0.15, AND MEASURED PROTONS AT 20.2, 21.6, 17.0, 12.4, 9.4, 7.6, 5.2, AND 2.2 KEV. OTHER DETECTORS WERE PLANNED INITIALLY FOR THIS EXPERIMENT BUT IT APPEARS THAT THE ABOVE ARE THE ONLY ONES THAT WERE FLOWN.

----- ISIS 2, SHEPHERD -----

EXPERIMENT NAME- CSJ0-A PHOTOMETER

NSSDC ID- 71-024A-12

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/04/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.G. SHEPHERD YORK U
TORONTO, ONTARIO, CANADA

EXPERIMENT BRIEF DESCRIPTION

A TWO-CHANNEL PHOTOMETER WAS USED TO MEASURE DIRECTLY AND TO MAP THE INTENSITY OF THE ATOMIC OXYGEN RED LINE AT 6300 A IN DAY, TWILIGHT, AND NIGHT AIRGLOW AND AURORA. EACH CHANNEL HAD ITS OWN OPTICAL INPUT, AND THE TWO INPUTS WERE MOUNTED AT THE SAME END OF THE SPACECRAFT, SEPARATED BY 180 DEG. WITH THEIR AXES AT 90 DEG TO THE SPACECRAFT'S SPIN AXIS. ONE OPTICAL INPUT WAS CHARACTERIZED BY A SPECTRAL BANDWIDTH OF 12 A CENTERED AROUND THE 6300 A LINE OF ATOMIC OXYGEN, AND THE OTHER INPUT WAS USED FOR WHITE LIGHT MEASUREMENTS. THE

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

SPINNING SATELLITE CAUSED THE PHOTOMETER TO ALTERNATELY VIEW THE EARTH AND THEN THE SKY, I.E., WHEN ONE SENSOR VIEWED THE EARTH, THE OTHER SENSOR SAW THE SKY. BOTH SENSORS HAD A 2.5-DEG CIRCULAR FIELD OF VIEW, WITH THE USE OF A DEAM COMBINER ARRANGEMENT, THE SAME PHOTOMULTIPLIER ACCEPTED THE TWO INPUTS. THE DYNAMIC RANGE OF INTENSITY MEASUREMENTS WAS FROM ABOUT 10 R TO MORE THAN ONE MEGARAYLEIGH. SUNLIGHT COULD ENTER THE OPTICAL SYSTEMS DIRECTLY IN ADDITION TO EARTH-REFLECTED LIGHT. THE INSTRUMENT RAFFLE WAS ILLUMINATED BY THE SUN ONLY FOR THE OFF-AXIS ANGLES LESS THAN 47 DEG. OUTSIDE THIS LIMIT, THE DATA WERE NOT DEGRADED BY SUNLIGHT, PERMITTING NORMAL OPERATION IN THE REGION OF THE ORBIT WHERE THE SPACECRAFT WAS IN SUNLIGHT BUT THE PORTION OF THE EARTH BENEATH IT WAS DARK. AN EXTERNAL LIGHT SOURCE 'SAW' THE FILTER ONLY WHEN IT WAS 7.5 DEG OR LESS OFF AXIS. IN THE RANGE 7.5 TO 47 DEG, GOOD DATA WERE STILL OBTAINED WHEN THE SUNLIT EARTH WAS THE ORIGIN OF THE CONTAMINATION. TO GIVE ACCURATE LOW LIGHT LEVEL READINGS, AS WELL AS COVER THE FULL DYNAMIC RANGE, AND TO PRESENT THE MEASUREMENTS IN A FORM COMPATIBLE WITH ENCODING AS AN 8-BIT BINARY WORD FOR TELEMETRY, A HYBRID LINEAR-LOG AMPLIFIER SYSTEM WAS USED. THE ELECTRONIC SYSTEM PULSE COUNTED AT LOW LIGHT LEVELS AND AMPLIFIED ON A LOG SCALE FOR HIGHER LIGHT LEVELS. IT WAS COMPOSED OF A PREAMP, TWO SIGNAL PROCESSING CHANNELS (LINEAR AND LOGARITHMIC), AND AN OUTPUT COMMUTATOR TO SELECT BETWEEN THEM AS WELL AS TO INTERFACE THEM TO THE SPACECRAFT SYSTEM. ALSO PROVIDED WERE CALIBRATION AND PROTECTION CIRCUITRY TO OPERATE THE CALIBRATE LAMPS AND TO PROTECT THE PHOTOFLUOR FROM THE EFFECTS OF EXPOSURE TO HIGH LIGHT LEVELS. TO PERFORM THE DATA ANALYSIS, IT WAS NECESSARY, AMONG OTHER OPERATIONS, TO EVALUATE DIFFERENT GEOMETRICAL SITUATIONS, AND TO LOCATE THE ON-EARTH LIND CROSSING OF THE 12 A BANDPASS PHOTOMETER SO THAT THE DATA COULD BE ORGANIZED INTO SPIN MAPS.

----- ISS 2, WHITTEKER -----

EXPERIMENT NAME- SWEEP FREQUENCY SOUNDER

NSSDC ID- 71-024A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/04/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. WHITTEKERCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - G.E.K. LOCKWOODCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - G.L. NELMSCOMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - J. TURNERAUST DEPT OF INTERIOR
SYDNEY, AUSTRALIA
OI - M. SYLVAINIONOSPHERIC RES GROUP
ORLEANS, FRANCE
OI - D. HOLTAURORA OBS
TRONSO, NORWAY
OI - Y. OGATARADIO RESEARCH LAB
TOKYO, JAPAN
OI - R. RAGHAVARANPHYSICAL RESEARCH LAB
AHMEDABAD, INDIA
OI - J.E. JACKSONNASA-GSFC
GREENBELT, MD
COMMON RESEARCH CENTRE
OTTAWA, ONTARIO, CANADA
OI - G.E. PETRIENASA-EH
BOULDER, CO
OI - T.E. VAN ZANDTNASA-ARC
BOFFETT FIELD, CA
OI - W. CALVERTNOAA-ERL
BOULDER, CO
OI - R.B. MORTONNOAA-ERL
BOULDER, CO
OI - J.W. KINGAPPLETON LAB
SLOUGH, BUCKS, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE ISS 2 IONOSONDE WAS A RADIO TRANSMITTER THAT RECORDED THE TIME DELAY BETWEEN A TRANSMITTED AND RETURNED RADIO FREQUENCY PULSE. A CONTINUUM OF FREQUENCIES BETWEEN 0.1 AND 20 MHZ WERE SAMPLED EVERY 14 OR 21 SEC, AND ONE OF SIX SELECTED FREQUENCIES WAS ALSO USED FOR SOUNDING FOR A FEW SECONDS DURING EACH 14- OR 21-SEC PERIOD. IN ADDITION TO THE SWEEP- AND FIXED-FREQUENCY MODES OF OPERATION, A MIXED MODE WAS AVAILABLE IN WHICH THE TRANSMITTER FREQUENCY WAS FIXED AT ONE OF SIX POSSIBLE FREQUENCIES WHILE THE RECEIVER SWEEPED SEVERAL VIRTUAL RANGE (DELAY TIME) TRACES RESULTING FROM GROUND REFLECTIONS, PLASMA RESONANCES, DIRECTION OF THE IONOSPHERE, NON-VERTICAL PROPAGATION, ETC., WERE NORMALLY OBSERVED. VIRTUAL RANGE AT A GIVEN FREQUENCY WAS PRIMARILY A FUNCTION OF DISTANCE TRAVERSED BY THE SIGNAL, ELECTRON DENSITY ALONG THE PROPAGATION PATH, AND MODE OF PROPAGATION. THE STANDARD DATA FORM WAS AN IONOGRAM (GRAPH) SHOWING VIRTUAL RANGE AS A FUNCTION OF RADIO FREQUENCY. TWO OTHER FORMS OF DATA WERE COMMONLY PREPARED FROM THE IONOGRAMS. THEY WERE DIGITAL FREQUENCY AND/OR VIRTUAL HEIGHT VALUES OF CHARACTERISTIC IONOSPHERIC FEATURES AND COMPUTATIONS OF THIS ELECTRON DENSITY PROFILES. INITIAL OPERATION OF THIS EXPERIMENT WAS NORMAL AND BOTH REAL-TIME AND TAPE RECORDED DATA WERE TAKEN UNTIL FEBRUARY 4, 1972, WHEN THE RECORDERS FAILED. REAL-TIME DATA HAVE BEEN TAKEN SUBSEQUENTLY.

***** ISS *****

SPACECRAFT COMMON NAME- ISS
ALTERNATE NAMES- IONOSPHERE SOUNDING SAT.
NSSDC ID- ISS

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 02/00/76 SPACECRAFT WEIGHT- 89. KG
LAUNCH SITE- TANEGASHIMA, JAPAN
LAUNCH VEHICLE- NU

SPONSORING COUNTRY/AGENCY
JAPAN NASDA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN INCLINATION- 70 DEG
PERIAPSIS- 1000.00 KM ALT APOAPSIS- 1000.00 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - K. TADRADIO RESEARCH LAB
TOKYO, JAPAN
PS - K. TADRADIO RESEARCH LAB
TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION

THIS SATELLITE WILL BE PART OF JAPAN'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE ISS OBJECTIVE WILL BE TO OBSERVE THE WORLDWIDE DISTRIBUTION OF THE VIRTUAL RANGE VS THE FREQUENCY (OBTAIN IONOGRAMS) OF THE TOPSIDE IONOSPHERE, AND TO OBSERVE THE WORLDWIDE DISTRIBUTION OF RADIO NOISE. THE IONOSPHERIC OBSERVATION WILL BE IN THE GENERAL RANGE OF 1 TO 15 MHZ. SEVERAL SUPPLEMENTAL OBSERVATIONS OF IN SITU PLASMA CHARACTERISTICS WILL ALSO BE CONDUCTED ALONG THE SATELLITE ORBIT. THESE OBSERVATIONS WILL INCLUDE DENSITY AND TEMPERATURE OF ELECTRONS, IONS MEASURED BY A RETARDING POTENTIAL TRAP, AN ION MASS SPECTROMETER, AND OBSERVATION OF THE EARTH'S MAGNETIC FIELD. THE SATELLITE WILL BE SPIN STABILIZED WITH ITS SPIN AXIS NORMAL TO THE ECLIPIC PLANE.

----- ISS, FUGONO -----

EXPERIMENT NAME- ION MASS SPECTROMETER

NSSDC ID- ISS -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - N. FUGONORADIO RESEARCH LAB
TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION

THE MAIN OBJECTIVE OF THIS ION COMPOSITION EXPERIMENT WILL BE TO MEASURE THE CONCENTRATIONS OF DIFFERENT ION SPECIES AND THEIR HEIGHT DISTRIBUTIONS AS A FUNCTION OF LOCATION, TIME, AND SOLAR AND GEOMAGNETIC ACTIVITY. TWO BENNETT-TYPE ION MASS SPECTROMETERS WITH ELECTRON MULTIPLIERS WILL BE USED. THESE SENSORS WILL BE MOUNTED ALONG THE SPIN AXIS WITH THEIR ORIFICES 180 DEG APART. THE MASS RANGE FROM 1 TO 20 AMU WILL BE SWEEP CONTINUOUSLY EVERY TWO SEC. THE SIGNAL WILL BE CONVERTED TO DIGITAL FORM.

----- ISS, MIYAZAKI -----

EXPERIMENT NAME- RETARDING POTENTIAL PROBE

NSSDC ID- ISS -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S. MIYAZAKIRADIO RESEARCH LAB
TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION

NO INFORMATION IS PRESENTLY AVAILABLE ON THIS PROBE BUT IT IS PROBABLY AN ION TRAP. SUCH TRAPS USUALLY USE ONE OR MORE SCREEN GRIDS MOUNTED IN FRONT OF A COLLECTOR. THE SCREENS WILL HAVE A VARIABLE VOLTAGE PATTERN APPLIED TO PERMIT EITHER ELECTRON OR ION CURRENTS. FOR A GIVEN SCREEN VOLTAGE, A VOLTAGE PROFILE PROVIDED TO THE COLLECTOR WILL PRODUCE A CURRENT/VOLTAGE PROFILE. ANALYSIS OF THIS PROFILE CAN PROVIDE TEMPERATURE, COMPOSITION, AND DENSITY DATA FOR IONS AND/OR ELECTRONS.

----- ISS, UNKNOWN -----

EXPERIMENT NAME- SWEEP FREQUENCY SOUNDER

NSSDC ID- ISS -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - UNKNOWNRADIO RESEARCH LAB
TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT'S OBJECTIVE WILL BE TO OBTAIN A WORLDWIDE DISTRIBUTION OF THE VIRTUAL HEIGHT VS. FREQUENCY

CHARACTERISTICS OF THE TOPSIDE IONOSPHERE.

----- ISS, UNKNOWN -----

EXPERIMENT NAME- RADIO NOISE

NSSDC ID- ISS -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - UNKNOWN *****RADIO RESEARCH LAB
TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT'S OBJECTIVE WILL BE TO OBTAIN A
WORLDWIDE DISTRIBUTION OF RADIO NOISE CAUSED BY ATMOSPHERICS.

***** ITOS-H *****

SPACECRAFT COMMON NAME- ITOS-H

ALTERNATE NAMES-

NSSDC ID- ITOS-H

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 4 QTR 76 SPACECRAFT WEIGHT- 633. KG

LAUNCH SITE- VANDENBERG AFB, UNITED STATES

LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY

UNITED STATES NOAA-NESS

UNITED STATES NASA-DA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- WENCHENPIC

ORBIT PERIOD- 120. MIN

PERIAPSIS- 1670.00 KM ALT

INCLINATION- 103. DEG

APOGAEE- 1670.00 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - S. WEILAND *****NASA-GSFC

GREENBELT, MD

PS - W. SHENK *****NASA-GSFC

GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

ITOS-H WILL BE THE SECOND IN A SERIES OF
THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL
METEOROLOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE
DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE PLATFORM FOR
TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER
ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) FOR OBSERVING
DAYTIME AND NIGHTTIME GLOBAL CLOUD COVER, AND A TIROS
OPERATIONAL VERTICAL SOUNDER (TOVS) FOR OBTAINING TEMPERATURE,
WATER VAPOR, AND OZONE PROFILES THROUGHOUT THE EARTH'S
ATMOSPHERE. SECONDARY EXPERIMENTS WILL INCLUDE THE SPACE
ENVIRONMENT MONITOR (SEM), WHICH WILL MEASURE THE PROTON AND
ELECTRON FLUX NEAR THE EARTH, AND THE DATA COLLECTION AND
PLATFORM LOCATION SYSTEM (DCS), WHICH WILL PROCESS AND RELAY
TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METEOROLOGICAL
DATA RECEIVED FROM FREE FLOATING BALLOONS AND OCEAN BUOYS
DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL BE ABLE TO
MAINTAIN AN EARTH-POINTING ACCURACY OF BETTER THAN PLUS OR
MINUS 1 DEG IN ALL THREE AXES, WITH MOTION RATES OF LESS THAN
0.035 DEG/SEC.

----- ITOS-H, NESS STAFF -----

EXPERIMENT NAME- ADVANCED VERY HIGH RESOLUTION
RADIOMETER (AVHRR)

NSSDC ID- ITOS-H -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - NESS STAFF *****NOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE ITOS-H ADVANCED VERY HIGH RESOLUTION RADIOMETER
(AVHRR) WILL BE CAPABLE OF PROVIDING GLOBAL DAYTIME AND
NIGHTTIME EARTH COVERAGE PICTURES ON A REGULAR DAILY BASIS
FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL
SCANNING INSTRUMENT WILL OPERATE IN BOTH REAL-TIME AND TAPE
RECORDING MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING
SPECTRAL WAVELENGTHS -- CHANNEL 1 - 0.6 TO 0.7 MICRON
(VISIBLE), CHANNEL 2 - 0.75 TO 1.0 MICRON (NEAR IR), CHANNEL
3 - 1.05 TO 1.25 MICRONS (IR WINDOW), AND CHANNEL 4 - 0.6 TO
7.0 MICRONS (WATER VAPOR). THE VISIBLE, NEAR IR, AND IR WINDOW
CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE
RESOLUTION OF THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS --
ABOUT 4 KM AT NAIR. EACH CHANNEL WILL HAVE ITS OWN
ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER, AN
ANALOG-TO-DIGITAL CONVERTER, AND OTHER AUXILIARY ELECTRONICS.
IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-1 AND -2.

----- ITOS-H, NESS STAFF -----

EXPERIMENT NAME- TIROS OPERATIONAL VERTICAL SOUNDER
(TOVS)

NSSDC ID- ITOS-H -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - NESS STAFF *****NOAA-NESS
SUITLAND, MD

OI - UNKNOWN *****METEOROLOGICAL OFFICE
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE
FLOWN ON ITOS-H IS DESIGNED TO INDIRECTLY DETERMINE THE
VERTICAL DISTRIBUTION OF TEMPERATURE, WATER VAPOR, AND OZONE
BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND
ITS ATMOSPHERE. THE TOVS TENTATIVELY CONSISTS OF TWO OPTICAL
UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. UNIT 1 WILL
HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL
INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION, CHANNEL
2 - THE 9.6-MICRON OZONE BAND, CHANNEL 3 - THE 11.1-MICRON
WINDOW REGION, EIGHT CHANNELS IN THE 15-MICRON CARBON DIOXIDE
BAND, AND THREE CHANNELS IN THE 10- TO 30-MICRON ROTATIONAL
WATER VAPOR BAND. THE SECOND UNIT WILL HAVE THREE CHANNELS
OPERATING AT 14.07 MICRONS USING SELECTIVE ABSORPTION BY
PASSING THE INCOMING RADIATION THROUGH THREE DOUBLE CELLS
CONTAINING GASEOUS CARBON DIOXIDE AT DIFFERENT PRESSURES. THE
SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE PLUS OR MINUS
40 DEG OF TRAVERSE SCANS, WHILE THE SPACECRAFT'S ORBITAL MOTION
WILL PROVIDE SCANNING IN THE ORTHOGONAL DIRECTION. THE DESIGN
WILL ALLOW SOUNDINGS TO BE TAKEN AS CLOSE AS 400 KM APART, AS
COMPARED TO THE 900-KM SEPARATION THAT IS PRESENTLY NEEDED
WITH THE SIRS-B EXPERIMENT ON NIMBUS II. VERTICAL PROFILES OF
TEMPERATURE, OZONE, AND WATER VAPOR WILL BE OBTAINED FROM THE
REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION
TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE
SURFACE TO 1 MB AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1
DEG K. THE WATER VAPOR PROFILE FROM THE SURFACE TO THE
TROPOPAUSE WILL BE ACCURATE TO 20 PERCENT, WHILE THE OZONE
WILL BE MEASURED TO WITHIN PLUS OR MINUS 0.01 CM. THE ITOS-I
TOVS WILL PROBABLY INCLUDE TWO ADDITIONAL INSTRUMENTS, ONE TO
MEASURE INTERVALS IN THE 4.3-MICRON CARBON DIOXIDE BAND AND
THE OTHER A MICROWAVE DEVICE TO MEASURE RADIATION IN THE
5.5-MM OXYGEN BAND.

----- ITOS-H, SHENK -----

EXPERIMENT NAME- SPACE ENVIRONMENT MONITOR (SEM)

NSSDC ID- ITOS-H -04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W. SHENK *****NASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MONITOR DIRECTIONAL
FLUXES OF (1) PROTONS IN FIVE CONTIGUOUS INTERVALS BETWEEN
0.15 AND 40 MEV (INTERVAL THRESHOLDS OF 0.15, 0.30, 0.60, 1.5,
AND 6.6 MEV), (2) PROTONS IN THE RANGES 400 TO 600 AND 600 TO
1000 MEV, (3) PROTONS ABOVE 1000 MEV, (4) ALPHA PARTICLES IN
FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.6 AND 100 MEV
(INTERVAL THRESHOLDS OF 0.60, 0.90, 1.4, 3.5, AND 11 MEV), (5)
ALPHA PARTICLES BETWEEN 330 AND 600 MEV, (6) ALPHA PARTICLES
ABOVE 600 MEV, AND (7) ELECTRONS ABOVE 250 KEV.
OMNIDIRECTIONAL FLUXES OF PROTONS ABOVE 10, 30, AND 60 MEV
WILL ALSO BE MONITORED.

----- ITOS-H, UNKNOWN -----

EXPERIMENT NAME- DATA COLLECTION AND PLATFORM LOCATION
SYSTEM (DCS)

NSSDC ID- ITOS-H -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - UNKNOWN *****NASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS)
WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE
UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH
PROGRAM (GARPA). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE
TRANSMISSIONS OF METEOROLOGICAL OBSERVATIONS FROM
FREE-FLOATING BALLOONS, OCEAN BUOYS, OTHER SATELLITES, AND
FIXED GROUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE
GLOBE. THE OBSERVATIONS FROM THE SPACECRAFT AND RETRANSMITTED
WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND RETRANSMITTED
WHEN THE SPACECRAFT COMES WITHIN RANGE OF A COMMAND AND DATA
ACQUISITION (CDA) STATION. FOR THE FREE-MOVING BALLOONS, THE
DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE OBSERVED TO
CALCULATE THE LOCATION OF THE BALLOONS. ALL INFORMATION
RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320-KB
SOLID-STATE BUFFER MEMORY. THE BUFFER WILL BE DESIGNED TO
HANDLE AN AVERAGE OF 10 TRANSMISSIONS PER ORBIT FROM UP TO 320
OBSERVATION PLATFORMS. THE SYSTEM WILL BE BUILT WITH A READOUT
CAPABILITY OF 0.8 KBS AS WELL AS AN 8-KBS CAPABILITY FOR DATA

TRANSMISSION TO A CDA STATION. THE GSFC-DEVELOPED DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROPICAL WINDS ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMBUS-F.

***** ITOS-I *****

SPACECRAFT COMMON NAME- ITOS-I
ALTERNATE NAMES-
NSSDC ID- ITOS-I

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 1 QTR 78 SPACECRAFT WEIGHT- 633. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NOAA-NFSS
UNITED STATES NASA-DA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 120. MIN INCLINATION- 103. DEG
PERIAPSIS- 1678.00 KM ALT APOAPSIS- 1678.00 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - S. WILANDNASA-GSFC
GREENBELT, MD
PS - W.E. SHENKNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ITOS-I WILL BE THE THIRD IN A SERIES OF THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL METEOROLOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE PLATFORM FOR TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) FOR OBSERVING DAYTIME AND NIGHTTIME GLOBAL CLOUD COVER AND A TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) FOR OBTAINING TEMPERATURE, WATER VAPOR, AND OZONE PROFILES THROUGHOUT THE EARTH'S ATMOSPHERE. SECONDARY EXPERIMENTS WILL INCLUDE THE SPACE ENVIRONMENT MONITOR (SEM), WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR THE EARTH AND THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS), WHICH WILL PROCESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METEOROLOGICAL DATA RECEIVED FROM FREE-FLOATING BALLOONS AND OCEAN BUOYS DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL BE ABLE TO MAINTAIN AN EARTH-POINTING ACCURACY OF BETTER THAN PLUS OR MINUS 1 DEG IN ALL THREE AXES, WITH MOTION RATES OF LESS THAN 0.035 DEG/SEC.

----- ITOS-I, NESS STAFF -----

EXPERIMENT NAME- ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)

NSSDC ID- ITOS-I -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFFNOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION
THE ITOS-I ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) WILL BE CAPABLE OF PROVIDING GLOBAL DAYTIME AND NIGHTTIME EARTH CLOUDCOVER PICTURES ON A REGULAR DAILY BASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL OPERATE IN BOTH REAL-TIME AND TAPE RECORDER MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTRAL WAVELENGTHS -- CHANNEL 1 - 0.5 TO 0.7 MICRON (VISIBLE), CHANNEL 2 - 0.75 TO 1.00 MICRON (NEAR IR), CHANNEL 3 - 10.5 TO 12.5 MICRONS (IR WINDOW), AND CHANNEL 4 - 6.5 TO 7.0 MICRONS (WATER VAPOR). THE VISIBLE, NEAR IR, AND IR WINDOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS, ABOUT 4 KM AT NADIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER, AN ANALOG-TO-DIGITAL CONVERTER, AND OTHER AUXILIARY ELECTRONICS. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-H AND -J.

----- ITOS-I, NESS STAFF -----

EXPERIMENT NAME- TIROS OPERATIONAL VERTICAL SOUNDER (TOVS)

NSSDC ID- ITOS-I -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFFNOAA-NFSS
SUITLAND, MD
OI - UNKNOWNMETEOROLOGICAL OFFICE
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION
THE TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE FLOWN ON ITOS-I IS DESIGNED TO INDIRECTLY DETERMINE THE

VERTICAL DISTRIBUTION OF TEMPERATURE, WATER VAPOR, AND OZONE BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMOSPHERE. THE TOVS TENTATIVELY WILL CONSIST OF TWO OPTICAL UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. UNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION, CHANNEL 2 - THE 9.4-MICRON OZONE BAND, CHANNEL 3 - THE 11.1-MICRON WINDOW REGION, EIGHT CHANNELS IN THE 15-MICRON CARBON DIOXIDE BAND, AND THREE CHANNELS IN THE 19- TO 30-MICRON ROTATIONAL WATER VAPOR BAND. THE SECOND UNIT WILL HAVE THREE CHANNELS OPERATING AT 14.07 MICRONS USING SELECTIVE ABSORPTION BY PASSING THE INCOMING RADIATION THROUGH THREE DOUBLE CELLS CONTAINING GASEOUS CARBON DIOXIDE AT DIFFERENT PRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE PLUS OR MINUS 40 DEG OF TRAVERSE SCAN, WHILE THE SPACECRAFT'S ORBITAL MOTION WILL PROVIDE SCANNING IN THE ORTHOGONAL DIRECTION. THE DESIGN WILL ALLOW SOUNDINGS TO BE TAKEN AS CLOSE AS 400 KM APART, AS COMPARED TO THE 900-KM SEPARATION THAT IS PRESENTLY NEEDED WITH THE SIRS-B EXPERIMENT ON NIMBUS 4. VERTICAL PROFILES OF TEMPERATURE, OZONE, AND WATER VAPOR WILL BE OBTAINED FROM THE REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE SURFACE TO 1 MD AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE FROM THE SURFACE TO THE TROPOPAUSE WILL BE ACCURATE TO 20 PERCENT, WHILE THE OZONE WILL BE MEASURED TO WITHIN PLUS OR MINUS 0.01 CM. THE TOVS WILL PROBABLY INCLUDE TWO ADDITIONAL INSTRUMENTS, ONE TO MEASURE INTERVALS IN THE 4.3-MICRON CARBON DIOXIDE BAND AND THE OTHER A MICROWAVE DEVICE TO MEASURE IN THE 5.6-MM OXYGEN BAND.

----- ITOS-I, UNKNOWN -----

EXPERIMENT NAME- DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS)

NSSDC ID- ITOS-I -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH PROGRAM (GARPA). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METEOROLOGICAL OBSERVATIONS FROM FREE-FLOATING BALLOONS, OCEAN BUOYS, OTHER SATELLITES, AND FIXED GROUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE OBSERVATIONS FROM THESE RANDOMLY LOCATED SOURCES WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND RETRANSMITTED WHEN THE SPACECRAFT COMES WITHIN RANGE OF A COMMAND AND DATA ACQUISITION (CDA) STATION. FOR THE FREE-MOVING BALLOONS, THE DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE OBSERVED TO CALCULATE THE LOCATION OF THE BALLOONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320-KB SOLID-STATE BUFFER MEMORY. THE BUFFER WILL BE DESIGNED TO HANDLE AN AVERAGE OF 10 TRANSMISSIONS PER ORBIT FROM UP TO 320 OBSERVATION PLATFORMS. THE SYSTEM WILL BE BUILT WITH A READOUT CAPABILITY OF 0.8 KBS AS WELL AS AN 8-KBS CAPABILITY FOR DATA TRANSMISSION TO A CDA STATION. THE GSFC-DEVELOPED DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROPICAL WINDS ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMBUS-F.

----- ITOS-I, UNKNOWN -----

EXPERIMENT NAME- SPACE ENVIRONMENT MONITOR (SEM)

NSSDC ID- ITOS-I -04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MONITOR DIRECTIONAL FLUXES OF (1) PROTONS IN FIVE CONTIGUOUS INTERVALS BETWEEN 0.15 AND 40 MEV (INTERVAL THRESHOLDS OF 0.15, 0.30, 0.60, 1.5, AND 0.6 MEV), (2) PROTONS IN THE RANGES 400 TO 600 AND 600 TO 1000 MEV, (3) PROTONS ABOVE 1000 MEV, (4) ALPHA PARTICLES IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.6 AND 100 MEV (INTERVAL THRESHOLDS OF 0.60, 0.90, 1.4, 3.5, AND 11 MEV), (5) ALPHA PARTICLES BETWEEN 330 AND 600 MEV, (6) ALPHA PARTICLES ABOVE 600 MEV, AND (7) ELECTRONS ABOVE 250 KEV. OMNIDIRECTIONAL FLUXES OF PROTONS ABOVE 10, 30, AND 60 MEV WILL ALSO BE MONITORED.

***** ITOS-J *****

SPACECRAFT COMMON NAME- ITOS-J
ALTERNATE NAMES-
NSSDC ID- ITOS-J

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 12/01/79 SPACECRAFT WEIGHT- 633. KG
LAUNCH SITE- VANDENBERG AFH, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DA
UNITED STATES NOAA-NFSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 120. MIN INCLINATION- 103. DEG
PERIAPSIS- 1670.00 KM ALT APOAPSIS- 1670.00 KM ALT

SPACECRAFT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, NI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S. WEILAND NASA-GSFC GREENBELT, MD
PI - W.E. SHENK NASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ITOS-J WILL BE THE FOURTH IN A SERIES OF THIRD-GENERATION SPACECRAFT IN THE NATIONAL OPERATIONAL METEOROLOGICAL SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO SERVE AS AN ECONOMICAL AND STABLE PLATFORM FOR TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER ANALYSIS AND FORECASTING. PRIMARY SENSORS WILL INCLUDE AN ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) FOR OBSERVING DAYTIME AND NIGHTTIME GLOBAL CLOUD COVER AND A TIRDS OPERATIONAL VERTICAL SOUNDER (TOVS) FOR OBTAINING TEMPERATURE, WATER VAPOR, AND OZONE PROFILES THROUGH THE EARTH'S ATMOSPHERE. SECONDARY EXPERIMENTS WILL INCLUDE THE SPACE ENVIRONMENT MONITOR (SEM), WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR THE EARTH, AND THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS), WHICH WILL PROCESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METEOROLOGICAL DATA RECEIVED FROM FREE FLOATING BALLOONS AND OCEAN BUOYS DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL BE ABLE TO MAINTAIN AN EARTH-POINTING ACCURACY OF BETTER THAN PLUS OR MINUS 1 DEG IN ALL THREE AXES, WITH MOTION RATES OF LESS THAN 0.035 DEG/SEC.

----- ITOS-J, NESS STAFF -----

EXPERIMENT NAME- ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)

NSSDC ID- ITOS-J -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, NI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NFSS STAFF NOAA-NFSS SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION
THE ITOS-J ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) WILL BE CAPABLE OF PROVIDING GLOBAL DAYTIME AND NIGHTTIME EARTH CLOUDCOVER PICTURES ON A REGULAR DAILY BASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL OPERATE IN BOTH REAL-TIME AND TAPE RECORDER MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTRAL WAVELENGTHS -- CHANNEL 1 - 0.5 TO 0.7 MICRON (VISIBLE), CHANNEL 2 - 0.75 TO 1.0 MICRON (NEAR IR), CHANNEL 3 - 1.05 TO 12.5 MICRONS (IR WINDOW), AND CHANNEL 4 - 6.5 TO 70.0 MICRONS (WATER VAPOR). THE VISIBLE, NEAR IR, AND IR WINDOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS, ABOUT 4 KM AT NADIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER, AN ANALOG-TO-DIGITAL CONVERTER, AND OTHER AUXILIARY ELECTRONICS. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-H AND -I.

----- ITOS-J, NESS STAFF -----

EXPERIMENT NAME- TIRDS OPERATIONAL VERTICAL SOUNDER (TOVS)

NSSDC ID- ITOS-J -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, NI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NFSS STAFF NOAA-NFSS SUITLAND, MD
NI - UNKNOWN METEOROLOGICAL OFFICE LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION
THE TIRDS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE FLOWN ON ITOS-J IS DESIGNED TO INDIRECTLY DETERMINE THE VERTICAL DISTRIBUTION OF TEMPERATURE, WATER VAPOR, AND OZONE BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMOSPHERE. THE TOVS TENTATIVELY WILL CONSIST OF TWO OPTICAL UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. UNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION, CHANNEL 2 - THE 4.6-MICRON OZONE BAND, CHANNEL 3 - THE 11.1-MICRON WINDOW REGION, EIGHT CHANNELS IN THE 15-MICRON CARBON DIOXIDE BAND, AND THREE CHANNELS IN THE 10- TO 30-MICRON ROTATIONAL WATER VAPOR BAND. THE SECOND UNIT WILL HAVE THREE CHANNELS OPERATING AT 14.97 MICRONS USING SELECTIVE ABSORPTION BY

PASSING THE INCOMING RADIATION THROUGH THREE DOUBLE CELLS CONTAINING GASEOUS CARBON DIOXIDE AT DIFFERENT PRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE PLUS OR MINUS 40 DEG OF TRAVERSE SCAN, WHILE THE SPACECRAFT'S ORBITAL MOTION WILL PROVIDE SCANNING IN THE ORTHOGONAL DIRECTION. THE DESIGN WILL ALLOW SOUNDINGS TO BE TAKEN AS CLOSE AS 400 KM APART, AS COMPARED TO THE 900-KM SEPARATION THAT IS PRESENTLY NEEDED WITH THE TIRDS-B EXPERIMENT ON NIMBUS 4. VERTICAL PROFILES OF TEMPERATURE, OZONE, AND WATER VAPOR WILL BE OBTAINED FROM THE REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE SURFACE TO 1 MD AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE FROM THE SURFACE TO THE TROPOPAUSE WILL BE ACCURATE TO 20 PERCENT, WHILE THE OZONE WILL BE MEASURED TO WITHIN PLUS OR MINUS 0.01 CM. THE TOVS WILL PROBABLY INCLUDE TWO ADDITIONAL INSTRUMENTS, ONE TO MEASURE INTERVALS IN THE 4.3-MICRON CARBON DIOXIDE BAND AND THE OTHER A MICROWAVE DEVICE TO MEASURE RADIATION IN THE 5.5-MM OXYGEN BAND.

----- ITOS-J, UNKNOWN -----

EXPERIMENT NAME- DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS)

NSSDC ID- ITOS-J -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, NI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN NASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH PROGRAM (GARPI). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METEOROLOGICAL OBSERVATIONS FROM FREE-FLOATING BALLOONS, OCEAN BUOYS, OTHER SATELLITES, AND FIXED GROUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE OBSERVATIONS FROM THESE RANDOMLY LOCATED SOURCES WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND RETRANSMITTED WHEN THE SPACECRAFT COMES WITHIN RANGE OF A COMMAND AND DATA ACQUISITION (CDA) STATION. FOR THE FREE-MOVING BALLOONS, THE DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE OBSERVED TO CALCULATE THE LOCATION OF THE BALLOONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320-KB SOLID-STATE BUFFER MEMORY. THE BUFFER WILL BE DESIGNED TO HANDLE AN AVERAGE OF 10 TRANSMISSIONS PER ORBIT FROM UP TO 320 OBSERVATION PLATFORMS. THE SYSTEM WILL BE BUILT WITH A READOUT CAPABILITY OF 0.8 KBS AS WELL AS AN 8-KBS CAPABILITY FOR DATA TRANSMISSION TO A CDA STATION. THE GSFC-DEVELOPED DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROPICAL WINDS ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMBUS-F.

----- ITOS-J, UNKNOWN -----

EXPERIMENT NAME- SPACE ENVIRONMENTAL MONITOR (SEM)

NSSDC ID- ITOS-J -04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, NI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN UNKNOWN

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MONITOR DIRECTIONAL FLUXES OF (1) PROTONS IN FIVE CONTIGUOUS INTERVALS BETWEEN 0.15 AND 40 MEV (INTERVAL THRESHOLDS OF 0.15, 0.30, 0.60, 1.5, AND 6.5 MEV), (2) PROTONS IN THE RANGES 400 TO 600 AND 600 TO 1000 MEV, (3) PROTONS ABOVE 1000 MEV, (4) ALPHA PARTICLES IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.6 AND 100 MEV (INTERVAL THRESHOLDS OF 0.60, 0.90, 1.4, 3.6, AND 11 MEV), (5) ALPHA PARTICLES BETWEEN 330 AND 600 MEV, (6) ALPHA PARTICLES ABOVE 600 MEV, AND (7) ELECTRONS ABOVE 250 KEV. OMNIDIRECTIONAL FLUXES OF PROTONS ABOVE 10, 30, AND 60 MEV WILL ALSO BE MONITORED.

***** IUE *****

SPACECRAFT COMMON NAME- IUE
ALTERNATE NAMES- INT ULTRAVIOLET FXPL, SAS-D
NSSDC ID- SAS-D

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 2HALF 76 SPACECRAFT WEIGHT- 400. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSO
INTERNATIONAL ESRO
SRC

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 1440. MIN INCLINATION- 0 DEG
PERIAPSIS- 42000. KM ALT APOAPSIS- 42000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - G.W. LONGANECKERNASA-GSFC GREENBELT, MD
PS - A.B. UNDERHILLNASA-GSFC GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE INTERNATIONAL ULTRAVIOLET EXPLORER (IUE, FORMERLY SAS-D) SATELLITE IS AN APPROVED MISSION FOR THE CONSTRUCTION OF A SPACE-BORNE ULTRAVIOLET ASTRONOMICAL OBSERVATORY TO BE USED AS AN INTERNATIONAL FACILITY. THE IUE IS TO CONTAIN A 45-CM TELESCOPE USED SOLELY FOR SPECTROSCOPY IN THE WAVELENGTH RANGE OF 1100 TO 3300 Å. THE PLANNING, CONSTRUCTION, AND ULTIMATE OPERATION OF THE IUE IS THE RESULT OF A CO-OPERATIVE INTERNATIONAL EFFORT. THE SATELLITE AND OPTICAL INSTRUMENTATION ARE TO BE PROVIDED BY THE GODDARD SPACE FLIGHT CENTER (GSFC). THE TELEVISION CAMERAS TO BE USED AS DETECTORS WILL BE PROVIDED BY THE UNITED KINGDOM SPACE RESEARCH COUNCIL (UKSRC). THE EUROPEAN SPACE RESEARCH ORGANIZATION (ESRO) IS TO SUPPLY SOLAR PADDLES FOR THE SATELLITE AND WILL CONSTRUCT A EUROPEAN CONTROL CENTER. AFTER LAUNCH, TWO-THIRDS OF THE OBSERVING TIME WILL BE DIRECTED FROM A CONTROL CENTER AT GSFC, AND ONE-THIRD OF THE TIME THE SATELLITE WILL BE OPERATED FROM THE EUROPEAN CONTROL CENTER NEAR MADRID. GUEST OBSERVERS WILL SUBMIT THEIR PROGRAMS FOR REVIEW AND EVALUATION TO EITHER NASA, UKSRC, OR ESRO AS THEY ARE RESIDENTS OF THE UNITED STATES, UNITED KINGDOM, OR ESRO COUNTRIES. SCIENTISTS NOT COVERED BY THESE CONDITIONS WILL SUBMIT THEIR PROJECT PLANS TO ANY ONE OF THESE NATIONAL AGENCIES. TO ACHIEVE THE OBJECTIVE THAT THE IUE BE AN EFFECTIVE GUEST ASTRONOMICAL OBSERVATORY IT WILL BE LAUNCHED INTO A SYNCHRONOUS ORBIT. THE CHOICE OF A SYNCHRONOUS ORBIT IS MADE TO TRANSFORM THE PROBLEMS AND TECHNIQUES OF TELESCOPE OPERATION INTO A SET SIMILAR TO THOSE FOR GROUND OBSERVATORIES, WHICH ARE ALREADY FAMILIAR TO EVERY OBSERVING ASTRONOMER. THE 45-CM RITCHIEY-CRÉTIEN F/15 TELESCOPE WILL FEED A SPECTROGRAPH PACKAGE. THE SPECTROGRAPH PACKAGE, USING SEC VIDICON CAMERAS AS DETECTORS, WILL COVER THE SPECTRAL RANGE FROM 1100 TO 3300 Å. IT WILL OPERATE IN EITHER A HIGH-RESOLUTION OR A LOW-RESOLUTION MODE. WITH RESOLUTIONS OF APPROXIMATELY 0.2 AND 0 Å, RESPECTIVELY, THE SEC VIDICONS CAN INTEGRATE THE SIGNAL FOR UP TO 1 HR. THIS INTEGRATION TIME WILL LIMIT DETECTION IN THE HIGH- AND LOW-RESOLUTION MODES TO APPROXIMATELY 5 AND 0.03 PHOTONS/(CM² SQ-SEC-ANGSTROM), RESPECTIVELY. FOR A SIGNAL-TO-NOISE RATIO OF 50, THESE SENSITIVITIES ARE EQUIVALENT TO OBSERVATIONS OF A 50 STAR OF NINTH TO FOURTEENTH MAGNITUDE, RESPECTIVELY.

----- IUE, NONE ASSIGNED -----

EXPERIMENT NAME- LOW/HIGH RESOLUTION, ULTRAVIOLET SPECTROGRAPH PACKAGE

NSSDC ID- SAS-D -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - NONE ASSIGNEDNASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INCLUDE THE ULTRAVIOLET SPECTROGRAPH PACKAGE CARRIED BY THE IUE, CONSISTING OF TWO PHYSICALLY DISTINCT ECHELLE-SPECTROGRAPH/CAMERA UNITS CAPABLE OF ASTRONOMICAL OBSERVATIONS. EACH SPECTROGRAPH WILL BE A THREE-ELEMENT ECHELLE SYSTEM, COMPOSED OF AN OFF-AXIS PARABOLOIDAL COLLIMATOR, AN ECHELLE GRATING, AND A SPHERICAL FIRST-ORDER GRATING THAT WILL BE USED TO SEPARATE THE ECHELLE ORDERS AND FOCUS THE SPECTRAL DISPLAY ON AN IMAGE CONVERTER-PLUS-SEC VIDICON CAMERA. (FOR EACH UNIT THERE WILL BE A SPARE CAMERA). THE CAMERA UNITS WILL BE ABLE TO INTEGRATE THE SIGNAL. THE READOUT/PREPARATION CYCLE FOR THE CAMERAS WILL BE TAKE APPROXIMATELY A MIN. WAVELENGTH CALIBRATION WILL BE PROVIDED BY THE USE OF A HOLLOW CATHODE COMPARISON LAMP. THE PHOTOMETRIC CALIBRATION WILL BE ACCOMPLISHED BY OBSERVING STANDARD STARS WHOSE SPECTRAL FLUXES HAVE BEEN PREVIOUSLY CALIBRATED BY OTHER MEANS. BOTH ECHELLE-SPECTROGRAPH/CAMERA UNITS WILL BE CAPABLE OF HIGH-RESOLUTION (0.2 Å) OR LOW-RESOLUTION (6 Å) PERFORMANCE. THE DUAL HIGH/LOW RESOLUTION CAPABILITY WILL BE IMPLEMENTED BY THE INSERTION OF A PLAT IN FRONT OF THE ECHELLE GRATING, SO THAT THE ONLY DISPERSION WILL BE PROVIDED BY THE SPHERICAL GRATING. AS THE SEC VIDICONS CAN INTEGRATE THE SIGNAL FOR UP TO 1 HR, DATA WITH A SIGNAL-TO-NOISE RATIO OF 50 CAN BE OBTAINED FOR A 50 STAR OF THE NINTH AND FOURTEENTH MAGNITUDE IN THE HIGH- AND LOW-RESOLUTION MODES, RESPECTIVELY. THE DISTINGUISHING CHARACTERISTICS OF THE UNITS WILL BE THEIR WAVELENGTH COVERAGE. ONE UNIT WILL COVER THE WAVELENGTH RANGE FROM 1192 TO 1924 Å IN THE HIGH-RESOLUTION MODE, AND 1135 TO 2085 Å IN THE LOW-RESOLUTION MODE. FOR THE OTHER UNIT, THE RANGES WILL BE FROM 1093 TO 3031 Å, AND 1000 TO 3255 Å FOR THE HIGH- AND LOW-RESOLUTION MODES, RESPECTIVELY. EACH UNIT WILL ALSO HAVE ITS OWN CHOICE OF ENTRANCE APERTURES EITHER FOR A 3-ARC-SEC HOLE OR A 10-X 20-ARC-SEC SLOT. THE 10-X 20-ARC-SEC SLOTS CAN BE BLOCKED BY A COMMON SHUTTER, BUT THE 3-ARC-SEC APERTURE WILL ALWAYS BE OPEN. AS A RESULT, TWO APERTURE CONFIGURATIONS ARE POSSIBLE -- (1) BOTH 3-ARC-SEC APERTURES OPEN AND BOTH 10-X 20-ARC-SEC SLOTS CLOSED, OR (2) ALL FOUR APERTURES OPEN. WITH THIS INSTRUMENTATION, THE OBSERVATIONAL OPTIONS OPEN TO

AN OBSERVER WILL BE LONG-WAVELENGTH AND/OR SHORT-WAVELENGTH SPECTROGRAPH, HIGH OR LOW RESOLUTION, AND LARGE OR SMALL APERTURES. EXPOSURES MAY BE MADE WITH THE TWO SPECTROGRAPHS SIMULTANEOUSLY, BUT REMEMBERING THAT THE ENTRANCE APERTURES FOR EACH ARE DISTINCT AND SEPARATED ON THE SKY BY ABOUT 1 MIN OF ARC. AN ADDITIONAL RESTRICTION IS THAT DATA CAN BE READ OUT OF ONLY ONE CAMERA AT A TIME. HOWEVER, ONE CAMERA MAY BE EXPOSING WHILE ONE CAMERA IS BEING READ OUT. THE CHOICE OF HIGH OR LOW RESOLUTION CAN BE MADE INDEPENDENTLY FOR THE TWO SPECTROGRAPHS SO THAT THE OPERATIONAL MODES OF THE UNITS NEED NOT BE THE SAME.

***** LAGEOS *****

SPACECRAFT COMMON NAME- LAGEOS
ALTERNATE NAMES- LASER GEODYNAMIC SAT.
NSSDC ID- LAGEOS

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 1 QTR 76 SPACECRAFT WEIGHT- 602. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 3700. MIN INCLINATION- 50. DEG
PERIAPSIS- 3700. KM ALT APOAPSIS- 3700. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.S. DILLERNASA HEADQUARTERS WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION

LAGEOS WILL BE A VERY DENSE (HIGH MASS/AREA RATIO) LASER RETROREFLECTOR SATELLITE WHICH WILL PROVIDE A PERMANENT REFERENCE POINT IN A VERY STABLE ORBIT FOR SUCH PRECISION EARTH-DYNAMICS MEASUREMENTS AS CRUSTAL MOTIONS, REGIONAL STRAINS, FAULT MOTIONS, POLAR MOTION AND EARTH-ROTATION VARIATIONS, SOLID EARTH TIDES, AND OTHER KINEMATIC AND DYNAMIC PARAMETERS ASSOCIATED WITH EARTHQUAKE ASSESSMENT AND ALLEVIATION. LAGEOS, IN CONJUNCTION WITH APPROPRIATE LASER TRACKING SYSTEMS, WILL PERMIT EXTREME PRECISION RANGING MEASUREMENTS FOR BOTH GEOMETRIC MODE (MULTILATERATION) AND ORBITAL DYNAMIC MODE DETERMINATIONS OF POSITIONS OF POINTS ON THE EARTH. IT WILL BE THE FIRST SPACECRAFT DEDICATED EXCLUSIVELY TO HIGH PRECISION LASER RANGING, AND WILL PROVIDE THE FIRST OPPORTUNITY TO ACQUIRE LASER-RANGING DATA THAT ARE NOT DEGRADED BY ERRORS ORIGINATING IN THE TARGET SATELLITE. THE HIGH ACCURACY RANGE MEASUREMENTS FROM THIS PERMANENT ORBITING REFERENCE POINT WILL BE USED TO ACCOMPLISH MANY EXTREME PRECISION EARTH-DYNAMICS MEASUREMENTS REQUIRED BY THE EARTHQUAKE HAZARD ASSESSMENT AND ALLEVIATION OBJECTIVES OF THE EARTH AND OCEAN PHYSICS APPLICATIONS PROGRAM (EOPAP). THE PERFORMANCE IN ORBIT OF LAGEOS WILL BE LIMITED ONLY BY DEGRADATION OF THE RETROREFLECTORS, SO MANY DECADES OF USEFUL LIFE CAN BE EXPECTED. THE HIGH MASS-TO-AREA RATIO AND THE PRECISE, STABLE (ATTITUDE-INDEPENDENT) GEOMETRY OF THE SPACECRAFT TOGETHER WITH THE PROPOSED ORBIT WILL MAKE THIS SATELLITE THE MOST PRECISE POSITION REFERENCE AVAILABLE. BECAUSE IT WILL BE VISIBLE IN ALL PARTS OF THE WORLD AND WILL HAVE AN EXTENDED OPERATION LIFE IN ORBIT, LAGEOS CAN SERVE AS A FUNDAMENTAL GLOBAL STANDARD FOR DECADES.

----- LAGEOS, PLOTKIN -----

EXPERIMENT NAME- LASER RETROREFLECTORS

NSSDC ID- LAGEOS -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.H. PLOTKINNASA-GSFC GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

LASER RETROREFLECTORS COVERING A VERY DENSE SPHERICAL SATELLITE WILL BE USED TO PROVIDE A PERMANENT REFERENCE POINT IN A VERY STABLE ORBIT FOR PRECISION EARTH-DYNAMICS MEASUREMENTS. THIS SPHERE WILL BE MACHINED Largely FROM DEPLETED URANIUM, WEIGH ABOUT 600 KG, AND BE COMPOSED OF A CUBICAL INNER CORE WITH SIX ATTACHED SPHERICAL CAPS. EACH OF THE SPHERICAL CAPS WILL HAVE MACHINED CAVITIES TO ACCOMMODATE THE RETROREFLECTORS. THE SATELLITE WILL BE PLACED AT A MID-TO-HIGH ORBITAL INCLINATION AT AN ALTITUDE OF ABOUT 3700 KM AND TRACKED BY A NETWORK OF 13 LASER STATIONS OPERATED BY BOTH U.S. AND FOREIGN AGENCIES. THE PERFORMANCE IN ORBIT WILL BE LIMITED ONLY BY DEGRADATION OF THE RETROREFLECTORS, AND A MINIMUM LIFETIME OF 50 YEARS IS EXPECTED.

***** LST *****

SPACECRAFT COMMON NAME- LST
ALTERNATE NAMES- LARGE SPACE TELESCOPE
NSSDC ID- LST

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- 09/09/80 SPACECRAFT WEIGHT- 9525. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES

LAUNCH VEHICLE- SHUTTLE

SPONSORING COUNTRY/AGENCY
UNITED STATES

NASA-OS5

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEMOCENTRIC

ORBIT PERIOD- MIN

PERIAPSIS- 6928. KM ALT

INCLINATION- 28.5 DEG

APOAPSIS- 6926. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.R. DODDNASA-MSFC
HUNTSVILLE, AL

SPACECRAFT BRIEF DESCRIPTION

THE PROPOSED LARGE SPACE TELESCOPE (LST) WILL BE A SPACE-BORNE, DIFFRACTION-LIMITED TELESCOPE WITH A PLANNED EFFECTIVE APERTURE OF APPROXIMATELY 3 M. THE INITIAL LAUNCH OF THE LST INTO EARTH ORBIT IS EXPECTED IN LATE 1980. THE SPACE SHUTTLE WILL BE USED FOR INITIAL LAUNCH, IN-ORBIT SERVICING, AND FOR RETURN OF THE LST TO THE GROUND FOR MAINTENANCE. THE ANTICIPATED MINIMUM OPERATIONAL LIFETIME, EXCLUDING DOWN TIME FOR PERIODIC MAINTENANCE AND UPDATING, IS 15 YRS. THE LST SYSTEM WILL SERVE AS A NATIONAL ASTRONOMICAL SPACE OBSERVATORY FACILITY. THE USE OF THE ONBOARD INSTRUMENTATION WILL BE OPEN TO SCIENTISTS OF ALL COUNTRIES. THUS, ITS DESIGN WILL BE MOST FLEXIBLE TO ALLOW FOR THE REPLACEMENT OF SCIENTIFIC INSTRUMENTATION WHEN NECESSARY, TO INCORPORATE TECHNOLOGICAL ADVANCES, AND TO SATISFY CHANGES IN THE OBSERVATIONAL INTERESTS OF THE ASTRONOMICAL COMMUNITY. INSTRUMENTATION UPDATING, REPAIR, OR REPLACEMENT WILL BE ACCOMPLISHED BY EITHER RETURN OF THE LST TO THE GROUND, OR BY UTILIZING SUITED ASTRONAUTS FOR IN-ORBIT WORK. PRESENT PHASE D DEFINITION STUDIES INDICATE A DESIRABLE COMPLEMENT OF INSTRUMENTS AS FOLLOWS -- (1) A HIGH-RESOLUTION CAMERA TO COVER THE SPECTRAL RANGE FROM 120 TO 1100 NM. (2) A HIGH-RESOLUTION SPECTROGRAPH, OF RESOLUTION APPROXIMATELY 10 TO THE FIFTH, FOR THE 120-1100 NM REGION. (3) A FAINT OBJECT SPECTROGRAPH FOR WORK IN THE 90-77-1100 NM REGION. (4) AN ASTROMETRIC PACKAGE FOR DOING WORK ON DOUBLE STARS, PROPER MOTIONS, PARALLAXES, ETC., AND (5) AN INFRARED PHOTOMETER AND/OR SPECTROMETER TO COVER THE WAVELENGTH INTERVAL FROM 1 TO 1000 MICRONS.

***** LUNAR POLAR ORB-DAUGHTER *****

SPACECRAFT COMMON NAME- LUNAR POLAR ORB-DAUGHTER
ALTERNATE NAMES- ALPO, AUTO-LUNAR POLAR ORBITER
NSSDC ID- LPO-D

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- PROPOSED SPACECRAFT WEIGHT- 80. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- LTTAT-DLTA

SPONSORING COUNTRY/AGENCY

UNITED STATES

NASA-OS5

PLANNED ORBIT PARAMETERS

ORBIT TYPE- SELENCENTRIC

ORBIT PERIOD- MIN

PERIAPSIS- 6000. KM ALT

INCLINATION- 0. DEG

APOAPSIS- 6000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.D. HEDGARDNASA-GSFC
GREENBELT, MD
PS - J. PHILPOTTSNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT WILL BE FOR A PROPOSED PROBE OF THE LUNAR ENVIRONMENT. IT IS CONCEIVED TO BE COMPOSED OF TWO SPACECRAFT IN A MOTHER-DAUGHTER RELATIONSHIP. THE DAUGHTER SPACECRAFT, WHICH WILL BE A RANGING AND COMMUNICATION STATION, WILL BE SENT INTO AN EQUATORIAL CIRCULAR ORBIT AT AN ALTITUDE OF 6000 TO 12000 KM. IN ORBIT THE PAYLOAD ANTICIPATED WILL BE ABOUT 80 KG (175 LBS) FOR THE DAUGHTER SHIP. THE SCIENTIFIC PAYLOAD WILL BE CONSTRAINED TO A DELTA VEHICLE. THE PROJECT IS IN THE STUDY PHASE NOW. IT IS EXPECTED THAT APO'S WILL BE SENT OUT IN FISCAL 1975.

***** LUNAR POLAR ORB-MOTHER *****

SPACECRAFT COMMON NAME- LUNAR POLAR ORB-MOTHER
ALTERNATE NAMES- ALPO, AUTO-LUNAR POLAR ORBITER
NSSDC ID- LPO-M

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- PROPOSED SPACECRAFT WEIGHT- 230. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- LTTAT-DLTA

SPONSORING COUNTRY/AGENCY

UNITED STATES

NASA-OS5

PLANNED ORBIT PARAMETERS

ORBIT TYPE- SELENCENTRIC

ORBIT PERIOD- MIN

PERIAPSIS- 103. KM ALT

INCLINATION- 85. DEG

APOAPSIS- 100. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.D. HEDGARDNASA-GSFC
GREENBELT, MD
PS - J. PHILPOTTSNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT WILL BE FOR A PROPOSED PROBE OF THE LUNAR ENVIRONMENT. IT IS CONCEIVED TO BE COMPOSED OF TWO SPACECRAFT IN A MOTHER-DAUGHTER RELATIONSHIP. THE MOTHER SHIP WILL CONTAIN THE SCIENTIFIC EXPERIMENTS, WHICH WILL INCLUDE X-RAY, GAMMA-RAY, MAGNETIC FIELD, AND GRAVITY-DETECTING SENSORS. IT IS PROPOSED THAT THE MOTHER SHIP HAVE A CIRCULAR NEAR-POLAR, NON-STABLE ORBIT WITH AN INCLINATION OF 95 DEG AT AN ALTITUDE OF 100 KM. IN ORBIT THE PAYLOAD ANTICIPATED WILL BE APPROXIMATELY 230 KG (500 LBS) FOR THE MOTHER SHIP. THE SCIENTIFIC PAYLOAD WILL BE CONSTRAINED TO A DELTA VEHICLE. THE PROJECT IS IN THE STUDY PHASE NOW. IT IS EXPECTED THAT APO'S WILL BE SENT OUT IN FISCAL 1975.

***** MARINER 10 *****

SPACECRAFT COMMON NAME- MARINER 10

ALTERNATE NAMES- MARINER 73, PL-732A

MARINER-J VENUS/MERCURY, MARINER VENUS/MERCURY
6919

NSSDC ID- 73-085A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 11/03/73.

LAUNCH DATE- 11/03/73 SPACECRAFT WEIGHT- 904. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY

UNITED STATES

NASA-OS5

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - W.F. GIBERSONNASA-JPL
PASADENA, CA

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT WAS THE FIRST ONE TO USE THE GRAVITATIONAL PULL OF ONE PLANET (VENUS) TO REACH ANOTHER (MERCURY). THE SPACECRAFT STRUCTURE WAS AN 18.15-KG, EIGHT-SIDED FRAMEWORK WITH EIGHT ELECTRONICS COMPARTMENTS. IT MEASURED 1.39 M DIAGONALLY AND 0.457 M IN DEPTH. TWO SOLAR PANELS, EACH 2.7 M LONG AND 0.97 M WIDE, WERE ATTACHED AT THE TOP, SUPPORTING 5.1 SQUARE METERS OF SOLAR CELL AREA. THE ROCKET ENGINE WAS LIQUID-FUELED, WITH TWO SETS OF REACTION JETS USED TO STABILIZE THE SPACECRAFT ON THREE AXES. IT CARRIED A LOW-GAIN OMNIDIRECTIONAL ANTENNA, COMPOSED OF A HONEYCOMB-DISC PARABOLIC REFLECTOR, 1.37 M IN DIAMETER, WITH FOCAL LENGTH 55 CM. FEEDS ENABLED THE SPACECRAFT TO TRANSMIT AT S-BAND AND X-BAND FREQUENCIES. THE SPACECRAFT CARRIED A CANOPUS STAR TRACKER, LOCATED ON THE UPPER RING STRUCTURE OF THE OCTAGONAL SATELLITE, AND ACQUISITION SUN SENSORS ON THE TIPS OF THE SOLAR PANELS. THE INTERIOR OF THE SPACECRAFT WAS INSULATED WITH MULTILAYER THERMAL BLANKETS AT TOP AND BOTTOM. A SUNSHADE WAS DEPLOYED AFTER LAUNCH TO PROTECT THE SPACECRAFT ON THE SOLAR-ORIENTED SIDE. INSTRUMENTS ABOARD THE SPACECRAFT MEASURED THE ATMOSPHERIC, SURFACE, AND PHYSICAL CHARACTERISTICS OF MERCURY AND VENUS. EXPERIMENTS INCLUDED TELEVISION PHOTOGRAPHY, AND MAGNETIC FIELD, PLASMA, INFRARED RADIOMETRY, ULTRAVIOLET SPECTROSCOPY, AND RADIO SCIENCE DETECTORS. AN EXPERIMENTAL X-BAND HIGH-FREQUENCY TRANSMITTER WAS FLOWN FOR THE FIRST TIME ON THIS SPACECRAFT. MARINER 10 WAS PLACED IN A PARKING ORBIT AFTER LAUNCH FOR APPROXIMATELY 25 MINUTES, THEN PLACED IN ORBIT AROUND THE SUN EN ROUTE TO VENUS. THE ORBIT DIRECTION WAS OPPOSITE TO THE MOTION OF THE EARTH AROUND THE SUN. MID-COURSE CORRECTIONS WERE MADE. THE SPACECRAFT PASSED VENUS ON FEBRUARY 9, 1974, AT A DISTANCE OF 4200 KM. IT CROSSED THE ORBIT OF MERCURY ON MARCH 29, 1974, AT 2046 UT. AT A DISTANCE OF ABOUT 704 KM FROM THE SURFACE. THE TV AND ULTRAVIOLET EXPERIMENTS WERE TURNED ON THE COMET KHOUATEK WHILE THE SPACECRAFT WAS ON THE WAY TO VENUS. A SECOND ENCOUNTER WITH MERCURY, WHEN MORE PHOTOGRAPHS WERE TAKEN, OCCURRED ON SEPTEMBER 21, 1974, AT AN ALTITUDE OF ABOUT 47,000 KM.

***** MARINER 10, BRIDGE *****

EXPERIMENT NAME- MEASUREMENT OF PLASMA ENVIRONMENT

NSSDC ID- 73-085A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 11/03/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.S. BRIDGEMSS INST OF TECH
CAMBRIDGE, MA
DI - J.H. DINSACKMSS INST OF TECH
CAMBRIDGE, MA
DI - A.J. LAZARUSMSS INST OF TECH
CAMBRIDGE, MA
DI - S. OLBERTMSS INST OF TECH
CAMBRIDGE, MA
DI - S.J. DANELOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - M.D. MONTGOMERYLOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - A.J. MUNDHAUSENNATL CTR FOR ATMOS RES
BOULDER, CO
DI - J.R. ASBRIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM
DI - K.W. OGILVIENASA-GSFC
GREENBELT, MD
DI - L.F. BURLAGANASA-GSFC
GREENBELT, MD

DI - R.E. HARTLENASA-GSFC
GREENBELT, MD
DI - C.W. SNYDERNASA-JPL
PASADENA, CA
DI - G.L. SISCOEU OF CALIF, LA
LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
A SET OF HEMISPHERICAL ANALYZER PLATES AND AN ELECTRON MULTIPLIER, ALL MOUNTED ON A SCAN PLATFORM, ARE PROGRAMMED WITH A SEQUENCE OF ANALYZER PLATE VOLTAGES TO DETERMINE THE DIRECTIONAL CHARACTERISTICS AND THE ENERGY SPECTRUM FOR ELECTRONS FROM 4 TO 400 EV AND IONS FROM 00 EV TO 0 KEV IN THE SOLAR WIND BETWEEN 0.4 AND 1 AU DISTANCE FROM THE SUN.

----- MARINER 10, BROADFOOT -----

EXPERIMENT NAME- EUV SPECTROSCOPY

NSSDC ID- 73-085A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 11/03/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.L. BROADFOOTKITZ PEAK NATL OBS
TUCSON, AZ
OI - M.B. MCLEODHARVARD U
CAMBRIDGE, MA
OI - M.J.S. BELTONKITZ PEAK NATL OBS
TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THE FLIGHT EXPERIMENT WAS MADE UP TO TWO INDEPENDENT INSTRUMENTS: A POINTING OCCULTATION SPECTROMETER FIXED ON THE SPACECRAFT BODY, AND AN AIRGLOW INSTRUMENT MOUNTED ON THE SPACECRAFT SCAN PLATFORM. NEAR MERCURY, THE OCCULTATION SPECTROMETER SEARCHED FOR AN ATMOSPHERE ABOVE THE EDGE (LIMB) OF THE PLANET'S DISK, AND THE AIRGLOW INSTRUMENT SCANNED THE ENTIRE DISK TO DETECT RADIATION FROM AND MEASURE THE ALTITUDE DISTRIBUTION OF CONSTITUENT GASES. DURING CRUISE, THE TWO INSTRUMENTS MEASURED THE DISTRIBUTION OF HYDROGEN LYMAN-ALPHA COMING FROM GALACTIC AND MAGELLANIC CLOUD SOURCES. IN ADDITION THE AIRGLOW INSTRUMENT OBSERVED THE HYDROGEN CORONA OF THE EARTH, SEARCHED FOR HELIUM, AND MEASURED THE REFLECTIVE PROPERTIES OF THE MOON AT EXTREME UV WAVELENGTH. THE OBJECTIVE GRATING SPECTROMETER WAS DESIGNED TO MEASURE AIRGLOW RADIATIONS IN THE SPECTRAL RANGE FROM 200 TO 1700 A. CHANNEL ELECTRON MULTIPLIERS WERE USED TO MEASURE THE RADIATION INTENSITY. THE FOLLOWING WAVELENGTHS (EXPRESSED IN ANGSTROMS) WERE SEARCHED WITH A SPECTRAL RESOLUTION OF 20 A, WITH THE CANDIDATE EMITTING SPECIES INDICATED IN BRACKETS --- 304 (HE+), 430 (BACKGROUND), 584 (HE), 740 (HE), 867 (AI), 1048 (AI), 1216 (H), 1304 (OI), 1480 (CO-FOURTH POS. BAND), AND 1657 (C). IN ADDITION, THE EXPERIMENT CONTAINED A PAIR OF ZERO-ORDER CHANNELS WITH EFFECTIVE BANDWIDTH FROM 200 TO 1500 A AND 1150 TO 1700 A, RESPECTIVELY. TO OBTAIN THE DESIRED MERCURY/SPACECRAFT ENCOUNTER, AN APPROPRIATE SOLAR OCCULTATION WAS NOT POSSIBLE AT VENUS, AND HENCE, THE OCCULTATION SPECTROMETER DID NOT FUNCTION FOR THE VENUS ENCOUNTER. THE AIRGLOW SPECTROMETER OBTAINED DESIRED MEASUREMENTS INCLUDING EMISSIONS FROM HYDROGEN, HELIUM, ATOMIC OXYGEN AND ATOMIC CARBON. MORE DETAILS OF THE VENUS MEASUREMENTS CAN BE OBTAINED FROM THE PAPER, 'ULTRAVIOLET OBSERVATIONS OF VENUS FROM MARINER 10 - PRELIMINARY RESULTS,' A. L. BROADFOOT, ET AL., SCIENCE, VOL 183, MARCH 29, 1974, PP 1315-1316.

----- MARINER 10, CHASE, JR. -----

EXPERIMENT NAME- TWO-CHANNEL IR RADIOMETER

NSSDC ID- 73-085A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT ZERO DATA ACQUISITION RATE SINCE 04/00/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.C. CHASE, JR.SANTA BARBARA RES CTR
GOLETA, CA
OI - D. MORRISONU OF HAWAII
HONOLULU, HI
OI - G. HUNCHCALIF INST OF TECH
PASADENA, CA
OI - G. NEUGEBAUERCALIF INST OF TECH
PASADENA, CA
OI - J.M. SAARIBOEING SCI RES LAB
SEATTLE, WA
OI - E.D. MINERNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

AN INFRARED RADIOMETER HAVING TWO CHANNELS, 22 TO 39 MICRONS (80 DEG K TO 300 DEG K) AND 10 TO 17 MICRONS (200 DEG K TO 650 DEG K), WAS USED TO OBSERVE THE THERMAL EMISSION FROM VENUS AND MERCURY IN TWO BROAD SPECTRAL BANDS. THE IR THERMAL EMISSION FROM THE SURFACE OF MERCURY BETWEEN LATE AFTERNOON AND EARLY MORNING (LOCAL TIME) AND DEVIATIONS FROM THE AVERAGE THERMAL BEHAVIOR OF THE SURFACE WAS MEASURED. MEASUREMENTS WERE ALSO MADE OF THE BRIGHTNESS TEMPERATURES OF VENUSIAN CLOUD TOPS AND LIMB DARKENING PHENOMENA.

----- MARINER 10, HOWARD -----

EXPERIMENT NAME- S- AND X-BAND RADIO PROPAGATION

NSSDC ID- 73-085A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 11/03/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.T. HOWARDSTANFORD U
STANFORD, CA
OI - G.S. LEVYNASA-JPL
PASADENA, CA
OI - I.I. SHAPIROMASS INST OF TECH
CAMBRIDGE, MA
OI - G. FJELDBONASA-JPL
PASADENA, CA
OI - A.J. KLEBRENASA-JPL
PASADENA, CA
OI - J.D. ANDERSONNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT UTILIZED THE ONBOARD S- AND X-BAND RADIO SUBSYSTEMS TO OBTAIN INFORMATION ON THE MERCURIAN AND VENUSIAN MASSES, GRAVITIES, HARMONICS, EPHEMERIDES, IONOSPHERES, ATMOSPHERES, RADII, AND SURFACE CHARACTERISTICS.

----- MARINER 10, MURRAY -----

EXPERIMENT NAME- TELEVISION PHOTOGRAPHY

NSSDC ID- 73-085A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT ZERO DATA ACQUISITION RATE SINCE 09/25/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.C. MURRAYKITZ PEAK NATL OBS
TUCSON, AZ
OI - M.J.S. BELTONKITZ PEAK NATL OBS
TUCSON, AZ
OI - G.P. KUIPERU OF ARIZONA
TUCSON, AZ
OI - V.F. SUOMIU OF WISCONSIN
MADISON, WI
OI - N.J. TRASK, JR.US GEOLOGICAL SURVEY
MENLO PARK, CA
OI - D.F. GAULTNASA-APC
WOFFERT FIELD, CA
OI - B.W. HARKEU OF PITTSBURGH
PITTSBURGH, PA
OI - M.E. DAVIESRAND CORP
SANTA MONICA, CA
OI - B.F. O'LEARYCORNELL U
ITHACA, NY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT TOOK TELEVISION-VIDEO PHOTOGRAPHY OF BOTH VENUS AND MERCURY. THE OBJECTIVES OF THE EXPERIMENT WERE - (1) TO MAP AND IDENTIFY THE MAJOR PHYSIOGRAPHIC PROVINCES OF MERCURY, (2) TO DETERMINE THE ORIENTATION OF THE SPIN AXIS OF MERCURY, (3) TO COMBINE ALL OF THE MERCURY DATA TO ESTABLISH A CARTOGRAPHIC COORDINATE SYSTEM, (4) TO INVESTIGATE THE TIME-DEPENDENT PROPERTIES OF THE VENUS ULTRAVIOLET CLOUDS, AND (5) TO OBTAIN HIGH-RESOLUTION IMAGERY OF THE MAIN CLOUDS OF VENUS. THE INSTRUMENT WAS A GEC 1 "VIDICON TUBE." IT HAD A 42-SEC FRAMING RATE AND A 0.48- BY 0.37-DEG FIELD OF VIEW AND USED TWO SPHERICAL TELESCOPE 150-MM OPTICS. APPROXIMATELY 6700 PICTURES, WITH A RESOLUTION OF 100 M, WERE OBTAINED.

----- MARINER 10, NESS -----

EXPERIMENT NAME- FLUXGATE MAGNETOMETERS

NSSDC ID- 73-085A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 11/03/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - N.F. NESSNASA-GSFC
GREENBELT, MD
OI - K.W. BEHANNONNASA-GSFC
GREENBELT, MD
OI - R.P. LEPPINGNASA-GSFC
GREENBELT, MD
OI - Y.C. WHANGCATHOLIC U OF AMERICA
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF TWO TRIAXIAL FLUXGATE MAGNETOMETERS DESIGNED TO MAKE VECTOR MEASUREMENTS OF THE MAGNETIC FIELD IN THE VICINITY OF MERCURY AND VENUS AND IN THE INTERPLANETARY MEDIUM. EACH SENSOR HAD DUAL OPERATING RANGES OF MINUS TO PLUS 16 GAMMAS AND 128 GAMMAS. BIAS OFFSET CAPABILITY EXTENDED THE OPERATING RANGE TO MINUS TO PLUS 4096 GAMMAS.

----- MARINER 10, SIMPSON -----

EXPERIMENT NAME- ENERGETIC PARTICLES

NSSDC ID- 73-085A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 11/03/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.A. SIMPSONU OF CHICAGO
CHICAGO, IL

OI - J.E. LANPOTU OF CHICAGO
CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT MEASURED THE CHEMICAL AND ISOTOPIC SPECIES OF SOLAR CHARGED PARTICLES HOMBARDING THE ATMOSPHERE AND SURFACE OF MERCURY. THE MEASUREMENTS ALSO INCLUDED A SEARCH FOR TRAPPED HIGH-ENERGY ELECTRONS AND PROTONS IN THE POSSIBLE MAGNETOSPHERES OF MERCURY AND VENUS. THE CHARGED PARTICLE TELESCOPE WAS SENSITIVE TO ELECTRONS AND PROTONS WITH ENERGIES 0.07, 200 KEV AND 0.07, 600 KEV, RESPECTIVELY.

***** METEOROID TECHNOLOGY SAT *****

SPACECRAFT COMMON NAME- METEOROID TECHNOLOGY SAT

ALTERNATE NAMES- METEC, MTS
06142, EXPLORER 46

NSSDC ID- 72-061A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/27/72.

LAUNCH DATE- 08/13/72 SPACECRAFT WEIGHT- 90. KG
LAUNCH SITE- Wallops Flight Facility, UNITED STATES
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-NAS

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 97.65 MIN
PERIAPSIS- 492. KM ALT

EPOCH DATE- 09/04/72
INCLINATION- 37.7 DEG
APOAPSIS- 811. KM ALT

RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 97.693 MIN
PERIAPSIS- 494.48 KM ALT

EPOCH DATE- 09/10/73
INCLINATION- 37.691 DEG
APOAPSIS- 792.50 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - C.V. METEORNASA-LARC
HAMPTON, VA

PS - W.H. KINARDNASA-LARC
HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION

THE OBJECTIVES OF THE METEOROID TECHNOLOGY SATFLLITE WERE TO MEASURE THE METEOROID PENETRATION RATES IN A BUMPER-PROTECTED TARGET, AND TO OBTAIN DATA ON METEOROID VELOCITY AND FLUX DISTRIBUTION. THE CENTRAL HUB OF THE SATELLITE WAS 320 CM LONG AND CARRIED THE VELOCITY AND IMPACT EXPERIMENTS. BUMPER TARGETS EXTENDED FROM THE SATELLITE, GIVING IT AN OVERALL WIDTH OF 701.5 CM. THE SPACECRAFT WAS SPIN STABILIZED AT 3 RPM, AND SHOULD HAVE OPERATED FOR A MINIMUM OF ONE YR. HOWEVER, TWO OF THE FOUR PRIMARY EXPERIMENT BUMPER PANELS FAILED TO DEPLOY, CAUSING THE SPACECRAFT TO REVOLVE ABOUT AN AXIS DIFFERENT THAN THAT PLANNED. THIS ORIENTATION CAUSED THE TELEMETRY SYSTEM BATTERY TO OVERHEAT, AND NECESSITATED THE TURNOFF OF BOTH SECONDARY EXPERIMENTS (EXPERIMENTS -02 AND -03) WITHIN TWO WEEKS AFTER LAUNCH.

----- METEOROID TECHNOLOGY SAT, HUMES -----

EXPERIMENT NAME- METEOROID PENETRATION

NSSDC ID- 72-061A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/27/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.H. HUMESNASA-LARC
HAMPTON, VA

OI - W.H. KINARDNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WAS TO MEASURE THE METEOROID PENETRATION RATES OF A BUMPER-PROTECTED TARGET. PENETRATIONS WERE MEASURED, USING TWELVE 2-MIL STAINLESS-STEEL PRESSURE CELLS LOCATED BEHIND 1-MIL STAINLESS-STEEL BUMPERS. THESE 12 CELLS WERE MOUNTED ON FOUR BUMPER PANELS WHICH EXTENDED OUT FROM THE CYLINDRICAL SPACECRAFT BODY. DUE TO A MALFUNCTION, ONLY TWO OF THE FOUR BUMPER PANELS DEPLOYED.

***** METEOSAT *****

SPACECRAFT COMMON NAME- METEOSAT

ALTERNATE NAMES- METEOROLOGICAL SATELLITE
NSSDC ID- METOSAT

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 4 QTR 76 SPACECRAFT WEIGHT- 625.8 KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
INTERNATIONAL ESRD

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 1440. MIN
PERIAPSIS- 36000. KM ALT

INCLINATION- DEG
APOAPSIS- 36000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

SPACECRAFT BRIEF DESCRIPTION

METEOSAT WILL BE A GEOSTATIONARY SPACECRAFT AND WILL SERVE AS PART OF ESRD'S (EUROPEAN SPACE RESEARCH OFFICE) CONTRIBUTION TO GARP (GLOBAL ATMOSPHERIC RESEARCH PROJECT). THE SPIN-STABILIZED SPACECRAFT WILL BE EQUIPPED WITH A VISUAL-INFRARED SENSOR TO PROVIDE NEAR-CONTINUOUS OBSERVATIONS OF VARIOUS WEATHER FEATURES. AS PART OF GARP, THE SATELLITE WILL HELP TO SUPPLY DATA REQUIRED FOR GLOBAL DATA SETS. TO BE USED IN IMPROVEMENT OF MACHINE WEATHER FORECASTS. IN GENERAL, THE SPACECRAFT DESIGN, INSTRUMENTATION, AND OPERATION WILL BE SIMILAR TO SMS/GOES.

***** MJS 77A *****

SPACECRAFT COMMON NAME- MJS 77A
ALTERNATE NAMES- MARINER JUPITER/SATURN A, OUTER PLANETS A
MARINER 77A

NSSDC ID- MARN77A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 08/00/77 SPACECRAFT WEIGHT- 700. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-055

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - H.M. SCHURMEIERNASA-JPL
PASADENA, CA

SPACECRAFT BRIEF DESCRIPTION

THE OVERALL OBJECTIVES OF THE TWO SPACECRAFT, MARINER 77A AND MARINER 77B, WILL BE TO CONDUCT EXPLORATORY INVESTIGATIONS OF THE PLANETARY SYSTEMS OF JUPITER AND SATURN AND OF THE INTERPLANETARY MEDIUM OUT TO SATURN. PRIMARY EMPHASIS WILL BE PLACED ON COMPARATIVE STUDIES OF THESE TWO PLANETARY SYSTEMS BY OBTAINING (1) MEASUREMENTS OF THE ENVIRONMENT, ATMOSPHERE, AND BODY CHARACTERISTICS OF THE PLANETS AND ONE OR MORE OF THE SATELLITES OF EACH PLANET, (2) STUDIES OF THE NATURE OF THE RINGS OF SATURN, AND (3) EXPLORATION OF THE INTERPLANETARY (OR INTERSTELLAR) MEDIUM AT INCREASING DISTANCES FROM THE SUN. THESE OBJECTIVES WILL BE ATTAINED BY USING A VARIETY OF INSTRUMENTS AND METHODS INCLUDING TV, A COHERENT S- AND X-BAND RF RECEIVER, AN INFRARED INTERFEROMETER AND RADIOMETER, ULTRAVIOLET SPECTROMETER, FLUXGATE MAGNETOMETERS, FARADAY CUPS, A CHARGED PARTICLE ANALYZER, PLASMA DETECTOR, PLASMA WAVE RADIO RECEIVER, COSMIC RAY TELESCOPES, PHOTOGRAPHIC CAMERA, AND A SWEEP FREQUENCY RADIO RECEIVER IN ALL APPROVED EXPERIMENTS. THE TWO SPACECRAFT WILL BE LAUNCHED WITHIN A MONTH OF EACH OTHER.

----- MJS 77A, BRIDGE -----

EXPERIMENT NAME- PLASMA

NSSDC ID- MARN77A-06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.S. BRIDGEMASS INST OF TECH
CAMBRIDGE, MA

OI - J.W. FELCHERMASS INST OF TECH
CAMBRIDGE, MA

OI - J.H. RINSACKMASS INST OF TECH
CAMBRIDGE, MA

OI - A.J. LAZARUSMASS INST OF TECH
CAMBRIDGE, MA

OI - S. OLBERTMASS INST OF TECH
CAMBRIDGE, MA

OI - V.M. VASYLIUNASMASS INST OF TECH
CAMBRIDGE, MA

OI - L.F. BURLAGANASA-GSFC
GREENBELT, MD

OI - R.E. HARTLENASA-GSFC
GREENBELT, MD

OI - K.W. OGILVIENASA-GSFC
GREENBELT, MD

OI - G.L. SISCOEU OF CALIF, LA
LOS ANGELES, CA

OI - A.J. HUNDHAUSENNATL CTR FOR ATMOS RES
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE PLASMA INVESTIGATION WILL MAKE USE OF TWO FARADAY CUP DETECTORS, ONE POINTED ALONG THE EARTH-SPACECRAFT LINE AND ONE AT RIGHT ANGLES TO THIS LINE. THE EARTH-POINTING DETECTOR

WILL DETERMINE THE MACROSCOPIC PROPERTIES OF THE PLASMA IONS, OBTAINING ACCURATE VALUES OF THEIR VELOCITY, DENSITIES, AND PRESSURE. THREE SEQUENTIAL ENERGY SCANS WILL BE EMPLOYED WITH DELTA E/E EQUAL TO 29, 7-2, AND 1-0 PERCENT, ALLOWING A COVERAGE FROM SUBSONIC TO HIGHLY SUPERSONIC FLOW. THE SIDE-LOOKING PARADAY CUP WILL MAKE MEASUREMENTS OF ELECTRONS IN THE ENERGY RANGE FROM 5 EV TO 1 KEV. THE INSTRUMENT WILL WEIGH 0.2 KG AND USE 6.5 W OF POWER.

----- NJS 77A. BROADFOOT -----

EXPERIMENT NAME- ULTRAVIOLET SPECTROSCOPY

NSSDC ID- NARN77A-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.L. BROADFOOTKITTS PEAK NATL OBS
TUCSON, AZ
OI - H.W. MOOSJOHNS HOPKINS U
BALTIMORE, MD
OI - M.J.S. DELTONKITTS PEAK NATL OBS
TUCSON, AZ
OI - D.P. STROBELKITTS PEAK NATL OBS
TUCSON, AZ
OI - T.M. DONAHUEU OF MICHIGAN
ANN ARBOR, MI
OI - M.B. MCLEODHARVARD U
CAMBRIDGE, MA
OI - J.C. MCCONNELLHARVARD U
CAMBRIDGE, MA
OI - R.W. GOODYHARVARD U
CAMBRIDGE, MA
OI - A. DALGARNOHARVARD U
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED OUT WITH AN EXTREME ULTRAVIOLET SPECTROMETER, UTILIZING 12 CHANNEL MULTIPLIERS AS SENSORS AND COVERING SELECTED SPECTRAL LINES IN THE RANGE FROM 400 TO 1800 Å. SIMILAR IN DESIGN TO THE INSTRUMENT CURRENTLY BEING FLOWN ON MARINER 10 MISSION. THE INVESTIGATION WILL ANALYZE THE ATMOSPHERES OF JUPITER, SATURN AND ENCOUNTERED SATELLITES FOR THEIR MAJOR CONSTITUENTS, INCLUDING THE DETERMINATION OF THE MIXING RATIO OF H₂ AND HE AND THE THERMAL STRUCTURE OF THE ATMOSPHERE. AN ADDITIONAL OBJECTIVE WILL BE TO STUDY THE DISTRIBUTION OF H₂ AND HE IN THE INTERPLANETARY AND INTERSTELLAR MEDIUM.

----- NJS 77A. ESHLEMAN -----

EXPERIMENT NAME- RADIO SCIENCE TEAM

NSSDC ID- NARN77A-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

TL - V.R. ESHLEMANSTANFORD U
STANFORD, CA
TM - J.D. ANDERSONNASA-JPL
PASADENA, CA
TM - T.A. CROFTSTANFORD U
STANFORD, CA
TM - G.L. TYLERSTANFORD U
STANFORD, CA
TM - G. FJELDDNASA-JPL
PASADENA, CA
TM - G.S. LEVYNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE RADIO SCIENCE TEAM WILL USE THE TELECOMMUNICATIONS SYSTEM OF THE NJS77 SPACECRAFT TO PERFORM THEIR STUDIES. THE SYSTEM WILL BE A COHERENT S- AND X-BAND DOWNLINK AND S-BAND UPLINK. THE SCIENCE OBJECTIVES OF THE RADIO SCIENCE INVESTIGATION INCLUDE -- (1) DETERMINE THE PHYSICAL PROPERTIES OF PLANETARY AND SATELLITE IONOSPHERES AND ATMOSPHERES BY EXAMINING THE PROPAGATION EFFECTS ON A DUAL FREQUENCY RADIO SIGNAL DURING IMMERSSION AND EMERSION OF SPACECRAFT OCCULTATION BY THE SUBJECT BODY, (2) DETERMINE PLANETARY AND SATELLITE MASSES, GRAVITY FIELDS AND DENSITIES BY PRECISE TRACKING OF A DUAL FREQUENCY RADIO SIGNAL FROM THE SPACECRAFT DURING THE ENCOUNTER PERIOD, AND (3) DETERMINE THE AMOUNT AND SIZE DISTRIBUTION OF MATERIAL IN SATURN'S RINGS AND THE RING DIMENSIONS BY EXAMINING THE PROPAGATION EFFECTS ON A DUAL FREQUENCY RADIO SIGNAL THAT PASSES THROUGH EACH RING IN SUCCESSION, AND THROUGH THE GAP BETWEEN THE C RING AND SATURN'S SURFACE.

----- NJS 77A. HANEL -----

EXPERIMENT NAME- INFRARED SPECTROSCOPY AND RADIOMETRY

NSSDC ID- NARN77A-03

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.A. HANELNASA-GSFC
GREENBELT, MD
OI - R.J. CONRATHNASA-GSFC
GREENBELT, MD
OI - V.G. KUNDENASA-GSFC
GREENBELT, MD
OI - P.O. LOWMAN, JR.NASA-GSFC
GREENBELT, MD
OI - W.C. MAGUIRENASA-GSFC
GREENBELT, MD
OI - J.C. PFARLNASA-GSFC
GREENBELT, MD
OI - J. PIRAGLIANASA-GSFC
GREENBELT, MD
OI - R.E. SAMUELSONNASA-GSFC
GREENBELT, MD
OI - T.E. BURKENASA-JPL
PASADENA, CA
OI - P. GIERASHCORNELL U
ITHACA, NY
OI - C.A. PONNAMPERUMAU OF MARYLAND
COLLEGE PARK, MD

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED OUT USING AN INFRARED RADIOMETER AND AN INTERFEROMETER SPECTROMETER SIMILAR IN DESIGN TO THE MARINER-MARS-71 IRIS, COMBINED INTO A SINGLE INSTRUMENT. THE INVESTIGATION WILL STUDY BOTH GLOBAL AND LOCAL ENERGY BALANCE, USING INFRARED SPECTRAL MEASUREMENTS IN CONJUNCTION WITH BROAD-BAND MEASUREMENTS OF REFLECTED SOLAR ENERGY. ATMOSPHERIC COMPOSITION WILL ALSO BE INVESTIGATED, INCLUDING DETERMINATION OF THE H₂/HE RATIO, AND THE ABUNDANCE OF CH₄ AND NH₃. VERTICAL TEMPERATURE PROFILES WILL BE OBTAINED ON THE PLANETS AND SATELLITES WITH ATMOSPHERES. STUDIES OF THE COMPOSITION, THERMAL PROPERTIES, AND SIZE OF PARTICLES IN SATURN'S RINGS WILL BE CONDUCTED. THE INTERFEROMETER WILL HAVE A SPECTRAL RANGE OF 200 TO 4000 1/CM, WHILE THE RADIOMETER RANGE WILL COVER 5000 TO 33,000 1/CM. THE INSTRUMENT WILL USE A SINGLE PRIMARY MIRROR 51 CM IN DIAM, WITH A FIELD OF VIEW OF 0.25 DEG.

----- NJS 77A. KRIMIGIS -----

EXPERIMENT NAME- LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE

NSSDC ID- NARN77A-07

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.M. KRIMIGISAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - C.Y. FANU OF ARIZONA
TUCSON, AZ
OI - G. GLOCKLERU OF MARYLAND
COLLEGE PARK, MD
OI - L.J. LANZAROTTIBELL TELEPHONE LAB
MURRAY HILL, NJ
OI - T.P. ARMSTRONGU OF KANSAS
LAWRENCE, KS
OI - W.I. AKFORDU OF CALIF, SAN DIEGO
SAN DIEGO, CA
OI - C.O. BOSTROMAPPLIED PHYSICS LAB
SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO STUDY THE MAGNETOSPHERES OF JUPITER AND SATURN USING A LOW-ENERGY MAGNETOSPHERIC PARTICLE ANALYZER. THIS DETECTOR WILL MAKE MEASUREMENTS IN (1) THE DISTANT MAGNETOSPHERE AND ROW SHOCK OF JUPITER, (2) THE POSSIBLE MAGNETOSPHERE OF SATURN, AND (3) THE TRAPPED RADIATION BELTS IN THE VICINITY OF JUPITER. ADDITIONALLY, THIS DETECTOR WILL BE ABLE TO STUDY LOW-ENERGY PARTICLES IN THE INTERPLANETARY MEDIUM. THE ENERGY RANGE OF THIS DETECTOR WILL BE 10 KEV TO 1.1 MEV FOR ELECTRONS AND 10 KEV TO 150 MEV FOR IONS. DURING THE INTERPLANETARY CRUISE PERIOD, PROTONS, ALPHA PARTICLES, AND HEAVIER NUCL (Z FROM 3 TO 26) WILL BE SEPARATELY IDENTIFIED AND THEIR ENERGY MEASURED IN THE RANGE FROM 0.05 TO 30 MEV, USING A LOW-ENERGY PARTICLE TELESCOPE. HOWEVER, SELECTION OF THE LOW-ENERGY TELESCOPE IS CONDITIONAL ON DEMONSTRATING THE PRODUCTION OF SUFFICIENTLY UNIFORM DETECTORS TO EFFECT THE SEPARATION OF THE NUCLEI IN THE LOW-ENERGY END OF THE PROPOSED INVESTIGATION RANGE (LESS THAN 1-3 MEV/NUCLEON).

----- NJS 77A. LILLIE -----

EXPERIMENT NAME- MULTIFILTER PHOTOPOLARIMETER,
2200-7300 Å

NSSDC ID- NARN77A-11

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.F. LILLIEU OF COLORADO
BOULDER, CO
OI - C.W. HORDU OF COLORADO
BOULDER, CO

01 - K. RANGU OF COLORADO
BOULDER, CO
01 - J.W. HANSENU OF ARIZONA
TUCSON, AZ
01 - D.L. CORFENU OF ARIZONA
TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN 8-IN F/11.1 TELESCOPE, WHICH CAN SEND ITS OBSERVATIONS THROUGH A POLARIZER AND A FILTER FOR ONE OF EIGHT BANDS IN THE 2200- TO 2300-Å SPECTRAL REGION, THEN ON TO A PHOTOMULTIPLIER TUBE. BY STUDY OF THESE EMISSION INTENSITY DATA, INFORMATION ON SURFACE TEXTURE AND COMPOSITION OF BOTH PLANETS (JUPITER AND SATURN) CAN BE OBTAINED, ALONG WITH INFORMATION ON SIZE DISTRIBUTION AND COMPOSITION OF THE SATURN RINGS, AND INFORMATION ON ATMOSPHERIC SCATTERING PROPERTIES AND DENSITY FOR BOTH PLANETS. MOLECULAR SCALE HEIGHTS FOR BOTH PLANETS CAN ALSO BE DETERMINED FROM THESE DATA.

----- NJS 77A, NESS -----

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETERS

NSDOC ID- MARN77A-05

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI-PRINCIPAL INVESTIGATOR, TL-TEAM LEADER
DI-OTHER INVESTIGATOR, TM-TEAM MEMBER)

PI - N.F. NESSNASA-GSFC
GREENBELT, MD
DI - N.H. ACUNANASA-GSFC
GREENBELT, MD
DI - K.W. REHANNONNASA-GSFC
GREENBELT, MD
DI - L.F. HURLAGANASA-GSFC
GREENBELT, MD
DI - R.P. LEPPINGNASA-GSFC
GREENBELT, MD
DI - F.M. NEUBAUERBRAUNSCHWIG, TECH U
BRAUNSCHWIG, FED REP OF GERMANY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO INVESTIGATE THE MAGNETIC FIELDS OF JUPITER AND SATURN, THE SOLAR WIND INTERACTION WITH THE MAGNETOSPHERES OF THESE PLANETS, AND THE INTERPLANETARY MAGNETIC FIELD TO THE EXTENT OF THE SOLAR WIND BOUNDARY WITH THE INTERSTELLAR MAGNETIC FIELD AND BEYOND, IF CROSSED. THE INVESTIGATION WILL BE CARRIED OUT USING TWO HIGH-FIELD AND TWO LOW-FIELD TRIAXIAL FLUXGATE MAGNETOMETERS. DATA ACCURACY OF THE INTERPLANETARY FIELDS WILL BE PLUS OR MINUS 0.1 GAUSS, AND THE RANGE OF MEASUREMENTS WILL BE FROM 0.01 GAUSS TO 20 GAUSS. THE INSTRUMENTATION WILL WEIGH 5.8 KG AND CONSUME 5.2 WATTS.

----- NJS 77A, SCARF -----

EXPERIMENT NAME- PLASMA WAVE

NSDOC ID- MARN77A-13

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI-PRINCIPAL INVESTIGATOR, TL-TEAM LEADER
DI-OTHER INVESTIGATOR, TM-TEAM MEMBER)

PI - F.L. SCARFTRW SYSTEMS GROUP
REDONDI BEACH, CA
DI - D.A. GURNEYU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL PROVIDE CONTINUOUS, SHEATH-INDEPENDENT MEASUREMENTS OF THE ELECTRON DENSITY PROFILE AT JUPITER AND SATURN. IT WILL ALSO GIVE BASIC INFORMATION ON LOCAL WAVE-PARTICLE INTERACTIONS REQUIRED TO CARRY OUT COMPARATIVE STUDIES OF THE PHYSICS OF THE JUPITER AND SATURN MAGNETOSPHERES. THE INSTRUMENTATION WILL CONSIST OF A 16-CHANNEL STEP FREQUENCY RECEIVER AND IT MAY INCLUDE LOW-FREQUENCY WAVEFORM DECTIVER WITH ASSOCIATED ELECTRONICS. THE FREQUENCY RANGE FOR THIS INSTRUMENT WILL BE FROM 10 HZ TO 50 KHZ. THIS INSTRUMENT WILL SHAPE THE 10-M ANTENNAS BEING DEVELOPED FOR THE PLANETARY RADIO ASTRONOMY INVESTIGATION.

----- NJS 77A, SMITH -----

EXPERIMENT NAME- TV PHOTOGRAPHY

NSDOC ID- MARN77A-01

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI-PRINCIPAL INVESTIGATOR, TL-TEAM LEADER
DI-OTHER INVESTIGATOR, TM-TEAM MEMBER)

PI - B.A. SMITHNEW MEXICO STATE U
LAS CRUCES, NM
DI - G.A. HOLGGSNASA-JPL
PASADENA, CA
DI - A.F. COOKSMITHSONIAN INST
WASHINGTON, DC
DI - G. DANIELSONNASA-JPL
PASADENA, CA
DI - M.E. DAVIESRAND CORP
SANTA MONICA, CA
DI - G.E. HUNTMETEOROLOGICAL OFFICE
DIACOT, BERKSHIRE, ENGLAND

01 - T. BWFNSTATE U OF NEW YORK
BUFFALO, NY
DI - C. SAGANCORNELL U
ITHACA, NY
DI - L.A. SODERLONUS GEOLOGICAL SURVEY
FLAGSTAFF, AZ
DI - V.F. SUMMIU OF WISCONSIN
MADISON, WI

EXPERIMENT BRIEF DESCRIPTION

THE TV PHOTOGRAPHIC EXPERIMENT WILL USE A TWO-CAMERA SYSTEM, BASED ON THE MARINER 9 TV SYSTEM. THIS SYSTEM WILL INCLUDE ONE NARROW-ANGLE, LONG FOCAL LENGTH CAMERA AND ONE WIDE-ANGLE, SHORT FOCAL LENGTH CAMERA. THE MAXIMUM RESOLUTION ACHIEVABLE WILL DEPEND GREATLY ON THE ACTUAL TRAJECTORY ON THIS MULTI-ENCOUNTER MISSION, BUT THE RESOLUTION WILL BE AS HIGH AS 0.5 TO 1.0 KM ON THE CLOSEST APPROACHES, AT JUPITER AND SATURN. THE RESOLUTION WILL BE 20 KM AND 5 KM, RESPECTIVELY. THE OBJECTIVES OF THE EXPERIMENT WILL BE TO PHOTOGRAPH GLOBAL MOTIONS AND CLOUD DISTRIBUTIONS ON JUPITER AND SATURN, GROSS DYNAMICAL PROPERTIES, ZONAL ROTATION, ORIENTATION OF SPIN AXIS, ZONAL SHEAR, VERTICAL SHEAR, FLOW INSTABILITIES, SPOTS, AND SPECTRUM OF SCALE OF ATMOSPHERIC MOTIONS IN TIME AND SPACE. ADDITIONAL OBJECTIVES WILL INCLUDE THE STUDY OF THE MODE OF RELEASE OF INTERNAL ENERGY FLUX (SEARCH FOR CONVECTION CELLS AND ROLLS), STUDY OF GROWTH, DISSIPATION, MORPHOLOGY, AND VERTICAL STRUCTURE OF CLOUD COMPLEXES, GROSS OPTICAL PROPERTIES, GLOBAL AND LOCALIZED SCATTERING FUNCTION IN THE VISIBLE SPECTRUM, POLARIMETRY, NATURE OF CHROMOPHORES, THEIR STRUCTURE AND DEVELOPMENT, AND HIGH RESOLUTION OF THE GREAT RED SPOT. THE OBJECTIVES OF THE SATELLITE ENCOUNTERS WILL INCLUDE -- (1) GROSS CHARACTERISTICS -- SIZE, SHAPE, ROTATION, SPIN AXIS, CARTOGRAPHY, IMPROVED EPHEMERIDES AND MAPS. (2) GEOLOGY -- MAJOR PHYSIOGRAPHIC PROVINCES, IMPACT AND VOLCANIC FEATURES, LINEAMENTS, POLAR CAPS, EROSION PROCESSES, AND LOW- AND HIGH-DENSITY SATELLITE COMPARATIVE STUDIES. DETECTION OF ATMOSPHERES, FROSTS, AND LIMA STRATIFICATION OF AEROSOLS. (3) SURFACE PROPERTIES -- COLORIMETRY, SCATTERING FUNCTION, NATURE OF BRIGHTNESS VARIATION (ESPECIALLY IAPETUS), AND SEARCH FOR NEW SATELLITES. STUDIES OF SATURN'S RINGS WILL BE CARRIED OUT. OBJECTIVES WILL INCLUDE -- (1) RESOLUTION OF INDIVIDUAL RING COMPONENTS OR CLUMPS OF MATERIAL, (2) VERTICAL AND RADIAL DISTRIBUTION OF MATERIAL OF VERY HIGH RESOLUTION, (3) SCATTERING FUNCTION, (4) COARSE POLARIMETRY, (5) OCCULTATION -- OPTICAL DEPTH, AND (6) DISTINGUISHING DIFFERENT TYPES OF MATERIAL IN THE RINGS. OTHER OBJECTIVES WILL BE TO SEARCH FOR NEW COMETS, ASTEROIDS, AND TARGETS OF OPPORTUNITY.

----- NJS 77A, VOGT -----

EXPERIMENT NAME- HIGH- AND MODERATELY LOW-ENERGY
COSMIC-RAY TELESCOPE

NSDOC ID- MARN77A-J6

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI-PRINCIPAL INVESTIGATOR, TL-TEAM LEADER
DI-OTHER INVESTIGATOR, TM-TEAM MEMBER)

PI - R.P. VOGTCALIF INST OF TECH
PASADENA, CA
DI - J.R. JOKIPIICALIF INST OF TECH
PASADENA, CA
DI - E.C. STONECALIF INST OF TECH
PASADENA, CA
DI - F.D. McDONALDNASA-GSFC
GREENBELT, MD
DI - B.J. TEEGARDENNASA-GSFC
GREENBELT, MD
DI - J.H. TRAINORNASA-GSFC
GREENBELT, MD
DI - W.P. WEBBERU OF NEW HAMPSHIRE
DURHAM, NH

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL STUDY THE ORIGIN AND ACCELERATION PROCESS, LIFE HISTORY, AND DYNAMIC CONTRIBUTION OF INTERSTELLAR COSMIC RAYS, THE NUCLEOSYNTHESIS OF ELEMENTS IN COSMIC RAY SOURCES, THE BEHAVIOR OF COSMIC RAYS IN THE INTERPLANETARY MEDIUM, AND THE TRAPPED PLANETARY ENERGETIC PARTICLE ENVIRONMENT. THE INSTRUMENTATION WILL INCLUDE A HIGH-ENERGY TELESCOPE SYSTEM (HETS) AND A LOW-ENERGY TELESCOPE SYSTEM (LETS). THE HETS WILL COVER AN ENERGY RANGE BETWEEN 6 AND 500 MEV/NUCLEON FOR NUCLEI RANGING IN ATOMIC NUMBERS FROM 1 THROUGH 30. IN ADDITION ELECTRONS IN THE ENERGY RANGE BETWEEN 3 AND 100 MEV/NUCLEON WILL BE MEASURED BY THIS TELESCOPE AND AN ELECTRON TELESCOPE (ET). THE LETS WILL MEASURE THE ENERGY AND DETERMINE THE IDENTITY OF NUCLEI FOR ENERGIES BETWEEN .15 AND 30 MEV/NUCLEON AND ATOMIC NUMBERS FROM 1 TO 30. THE INSTRUMENTS WILL ALSO MEASURE THE ANISOTROPIES OF ELECTRONS AND NUCLEI. THE WEIGHT AND POWER ALLOCATIONS FOR THIS INVESTIGATION WILL BE 5.2 KG AND 5.4 W.

----- NJS 77A, WARRICK -----

EXPERIMENT NAME- PLANETARY RADIO ASTRONOMY

NSDOC ID- MARN77A-10

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.W. MARWICKU OF COLORADO
BOULDER, CO
DI - J.K. ALEXANDER, JR.NASA-GSFC
GREENBELT, MD
DI - T.D. CARPU OF FLORIDA
GAINESVILLE, FL
DI - F.T. HADDOCKU OF MICHIGAN
ANN ARBOR, MI
DI - D.H. STAFLINMASS INST OF TECH
CAMBRIDGE, MA
DI - A. DISCHOTPARIS OBSERVATORY
NEUDON, FRANCE
DI - C.C. HARVEYPARIS OBSERVATORY
PARIS, FRANCE
DI - Y. LEBLANCPARIS OBSERVATORY
NEUDON, FRANCE
DI - W.E. BROWNNASA-JPL
PASADENA, CA
DI - S. GULKISNASA-JPL
PASADENA, CA
DI - R. PHILLIPSNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A SWEEP FREQUENCY RADIO RECEIVER OPERATING IN BOTH POLARIZATION STATES, BETWEEN 20 KHZ AND 40.5 MHZ. THE SIGNAL WILL BE RECEIVED BY A PAIR OF ORTHOGONAL 10-M MONOPOLE ANTENNAE. STUDY OF THE RADIO EMISSION SIGNALS FROM JUPITER AND SATURN OVER THIS RANGE OF FREQUENCIES WILL YIELD DATA CONCERNING THE PHYSICS OF MAGNETOSPHERIC PLASMA RESONANCES AND NON-THERMAL RADIO EMISSIONS FROM THESE PLANETARY REGIONS.

***** MJS 77D *****

SPACECRAFT COMMON NAME- MJS 77B
ALTERNATE NAMES- MARINER JUPITER/SATURN D, OUTER PLANETS D
MARINER 77B
NSSDC ID- MARN77B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 08/00/77 SPACECRAFT WEIGHT- 700. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - H.M. SCHURMEIERNASA-JPL
PASADENA, CA

SPACECRAFT BRIEF DESCRIPTION

THE OVERALL OBJECTIVES OF THE SPACECRAFT MARINER 77A AND MARINER 77B WILL BE TO CONDUCT EXPLORATORY INVESTIGATIONS OF THE PLANETARY SYSTEMS OF JUPITER AND SATURN AND OF THE INTERPLANETARY MEDIUM OUT TO SATURN. PRIMARY EMPHASIS WILL BE PLACED ON COMPARATIVE STUDIES OF THESE TWO PLANETARY SYSTEMS BY OBTAINING (1) MEASUREMENTS OF THE ENVIRONMENT, ATMOSPHERE, AND BODY CHARACTERISTICS OF THE PLANETS AND ONE OR MORE OF THE SATELLITES OF EACH PLANET, (2) STUDIES OF THE NATURE OF THE RINGS OF SATURN, AND (3) EXPLORATION OF THE INTERPLANETARY (OR INTERSTELLAR) MEDIUM AT INCREASING DISTANCES FROM THE SUN. THESE OBJECTIVES WILL BE OBTAINED USING A VARIETY OF INSTRUMENTS AND METHODS INCLUDING TV, A COHERENT S- AND X-BAND RF RECEIVER, AN INFRARED INTERFEROMETER AND RADIOMETER, AN ULTRAVIOLET SPECTROMETER, FLUXGATE MAGNETOMETERS, FARADAY CUPS, A CHARGED PARTICLE ANALYZER, PLASMA DETECTOR, PLASMA WAVE RADIO RECEIVER, COSMIC RAY TELESCOPES, PHOTOPOLARIMETER, AND A SWEEP FREQUENCY RADIO RECEIVER. THE TWO SPACECRAFT WILL BE LAUNCHED WITHIN A MONTH OF EACH OTHER.

***** MJS 77B, BRIDGE *****

EXPERIMENT NAME- PLASMA

NSSDC ID- MARN77B-06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.S. BRIDGEMASS INST OF TECH
CAMBRIDGE, MA
DI - F.J. LAZARUSMASS INST OF TECH
CAMBRIDGE, MA
DI - S. OLBERTMASS INST OF TECH
CAMBRIDGE, MA
DI - J.W. BELCHERMASS INST OF TECH
CAMBRIDGE, MA
DI - V.N. VASYLIUNASMASS INST OF TECH
CAMBRIDGE, MA
DI - L.F. BURLAGANASA-GSFC
GREENBELT, MD
DI - J.H. BINSACKMASS INST OF TECH
CAMBRIDGE, MA
DI - G.L. SISCOEU OF CALIF, LA
LOS ANGELES, CA
DI - A.J. HUNDHAUSENNATL CTR FOR ATMOS RES
BOULDER, CO
DI - R.E. HARTLENASA-GSFC
GREENBELT, MD

DI - K.W. OGILVIENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE PLASMA INVESTIGATION WILL MAKE USE OF TWO FARADAY CUP DETECTORS, ONE POINTED ALONG THE EARTH-SPACECRAFT LINE AND ONE AT RIGHT ANGLES TO THIS LINE. THE EARTH-POINTING DETECTOR WILL DETERMINE THE MACROSCOPIC PROPERTIES OF THE PLASMA IONS, OBTAINING ACCURATE VALUES OF THEIR VELOCITY, DENSITY, AND PRESSURE. THREE SEQUENTIAL ENERGY SCANS WILL BE EMPLOYED WITH DELTA E/E EQUAL TO 29, 7.2, AND 1.8 PERCENT, ALLOWING A COVERAGE FROM SUBSONIC TO HIGHLY SUPERSONIC FLOW. THE SIDE-LOOKING FARADAY CUP WILL MAKE MEASUREMENTS OF ELECTRONS IN THE ENERGY RANGE FROM 5 EV TO 1 KEV. THE INSTRUMENT WILL WEIGH 0.2 KG AND USE 0.5 W OF POWER.

***** MJS 77B, BROADFOOT *****

EXPERIMENT NAME- ULTRAVIOLET SPECTROSCOPY

NSSDC ID- MARN77B-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.L. BROADFOOTKITT PEAK NATL OBS
TUCSON, AZ
DI - A. DALGARNOHARVARD U
CAMBRIDGE, MA
DI - J.C. MCCONNELLHARVARD U
CAMBRIDGE, MA
DI - R.W. GOODYHARVARD U
CAMBRIDGE, MA
DI - T.H. DONAHUEU OF MICHIGAN
ANN ARBOR, MI
DI - W.B. MELROYHARVARD U
CAMBRIDGE, MA
DI - W.J.S. BELTONKITT PEAK NATL OBS
TUCSON, AZ
DI - D.F. STROBELKITT PEAK NATL OBS
TUCSON, AZ
DI - H.W. MOOSJOHNS HOPKINS U
BALTIMORE, MD

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED OUT WITH AN EXTREME ULTRAVIOLET SPECTROMETER UTILIZING 12 CHANNEL MULTIPLIERS AS SENSORS AND COVERING SELECTED SPECTRAL LINES IN THE RANGE FROM 400 TO 1800 Å. SIMILAR IN DESIGN TO THE INSTRUMENT CURRENTLY BEING FLOWN ON THE MARINER 10 MISSION, THE INVESTIGATION WILL ANALYZE THE ATMOSPHERES OF JUPITER, SATURN AND ENCOUNTERED SATELLITES FOR THEIR MAJOR CONSTITUENTS, INCLUDING THE DETERMINATION OF THE MIXING RATIO OF H₂ AND HE AND THE THERMAL STRUCTURE OF THE ATMOSPHERE. AN ADDITIONAL OBJECTIVE WILL BE TO STUDY THE DISTRIBUTION OF H₂ AND HE IN THE INTERPLANETARY AND INTERSTELLAR MEDIUM.

***** MJS 77B, FSHLEMAN *****

EXPERIMENT NAME- RADIO SCIENCE TEAM

NSSDC ID- MARN77B-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

TL - V.R. FSHLEMANSTANFORD U
PASADENA, CA
TM - G. FJELDBONASA-JPL
PASADENA, CA
TM - G.S. LEVYNASA-JPL
PASADENA, CA
TM - T.A. CROFTSTANFORD U
STANFORD, CA
TM - G.L. TYLERSTANFORD U
STANFORD, CA
TM - J.D. ANDERSONNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE RADIO SCIENCE TEAM WILL USE THE TELECOMMUNICATIONS SYSTEM OF THE MJS77 SPACECRAFT TO PERFORM THEIR STUDIES. THE SYSTEM WILL BE A COHERENT S- AND X-BAND DOWNLINK AND S-BAND UPLINK. THE SCIENCE OBJECTIVES OF THE RADIO SCIENCE INVESTIGATION INCLUDE -- (1) DETERMINE THE PHYSICAL PROPERTIES OF PLANETARY AND SATELLITE IONOSPHERES AND ATMOSPHERES BY EXAMINING THE PROPAGATION EFFECTS ON A DUAL FREQUENCY RADIO SIGNAL DURING IMMERSION AND EMERSON OF SPACECRAFT OCCULTATION BY THE SUBJECT BODY, (2) DETERMINE PLANETARY AND SATELLITE MASSES, GRAVITY FIELDS AND DENSITIES BY PRECISE TRACKING OF A DUAL FREQUENCY RADIO SIGNAL FROM THE SPACECRAFT DURING THE ENCOUNTER PERIOD, AND (3) DETERMINE THE AMOUNT AND SIZE DISTRIBUTION OF MATERIAL IN SATURN'S RINGS AND THE RING DIMENSIONS BY EXAMINING THE PROPAGATION EFFECTS ON A DUAL FREQUENCY RADIO SIGNAL THAT PASSES THROUGH EACH RING IN SUCCESSION, AND THROUGH THE GAP BETWEEN THE C RING AND SATURN'S SURFACE.

***** MJS 77B, HANEL *****

EXPERIMENT NAME- INFRARED SPECTROSCOPY AND RADIOMETRY

NSSDC ID- MARN77B-03

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.A. HANELNASA-GSFC
GREENBELT, MD
OI - C.A. BONNAMPERJHAU OF MARYLAND
COLLEGE PARK, MD
OI - T.E. BURKENASA-JPL
PASADENA, CA
OI - P. GIEHARSHCORNELL U
ITHACA, NY
OI - J. PIRAGLIANASA-GSFC
GREENBELT, MD
OI - R.E. SAMUELSONNASA-GSFC
GREENBELT, MD
OI - W.C. MAGUIRENASA-GSFC
GREENBELT, MD
OI - J.C. PEARLNASA-GSFC
GREENBELT, MD
OI - V.G. KUNDENASA-GSFC
GREENBELT, MD
OI - P.D. LOWMAN, JR.NASA-GSFC
GREENBELT, MD
OI - B.J. CONEATHNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL BE CARRIED OUT USING AN INFRARED RADIOMETER AND AN INTERFEROMETER SPECTROMETER SIMILAR IN DESIGN TO THE MARINER-NARS 71 TRIS, COMBINED INTO A SINGLE INSTRUMENT. THE INVESTIGATION WILL STUDY BOTH GLOBAL AND LOCAL ENERGY BALANCE, USING INFRARED SPECTRAL MEASUREMENTS IN CONJUNCTION WITH BROAD-BAND MEASUREMENTS OF REFLECTED SOLAR ENERGY. ATMOSPHERIC COMPOSITION WILL ALSO BE INVESTIGATED, INCLUDING DETERMINATION OF THE H₂/HE RATIO, AND THE ABUNDANCE OF CH₄ AND NH₃. VERTICAL TEMPERATURE PROFILES WILL BE OBTAINED ON THE PLANETS AND SATELLITES WITH ATMOSPHERES. STUDIES OF THE COMPOSITION, THERMAL PROPERTIES, AND SIZE OF PARTICLES IN SATURN'S RINGS WILL BE CONDUCTED. THE INTERFEROMETER WILL HAVE A SPECTRAL RANGE OF 700 TO 4000 1/CM, WHILE THE RADIOMETER RANGE WILL COVER 5000 TO 33,000 1/CM. THE INSTRUMENT WILL USE A SINGLE PRIMARY MIRROR 51 CM IN DIAM. WITH A FIELD OF VIEW OF 0.2° DEG.

----- NJS 770, KRIMIGIS -----

EXPERIMENT NAME- LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE

NSSDC ID- MARN770-07

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.M. KRIMIGISAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - C.O. BUSTROMAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - T.D. ARMSTRONGU OF KANSAS
LAWRENCE, KS
OI - W.L. AXFORDU OF CALIF, SAN DIEGO
SAN DIEGO, CA
OI - G. GLOECKLERU OF MARYLAND
COLLEGE PARK, MD
OI - L.J. LANZENTHBELL TELEPHONE LAB
MURRAY HILL, NJ
OI - C.Y. FANU OF ARIZONA
TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO STUDY THE MAGNETOSPHERES OF JUPITER AND SATURN USING A LOW-ENERGY MAGNETOSPHERIC PARTICLE ANALYZER. THIS DETECTOR WILL MAKE MEASUREMENTS (1) IN THE DISTANT MAGNETOSPHERE AND BOW SHOCK OF JUPITER, (2) THE POSSIBLE MAGNETOSPHERE OF SATURN, AND (3) THE TRAPPED RADIATION BELTS IN THE VICINITY OF JUPITER. ADDITIONALLY, THIS DETECTOR WILL BE ABLE TO STUDY LOW-ENERGY PARTICLES IN THE INTERPLANETARY MEDIUM. THE ENERGY RANGE OF THIS DETECTOR WILL BE 10 KEV TO 1.1 MEV FOR ELECTRONS AND 10 KEV TO 150 MEV FOR IONS. DURING THE INTERPLANETARY CRUISE PERIOD, PROTONS, ALPHA PARTICLES, AND HEAVIER NUCLEI (2 FROM 3 TO 26) WILL BE SEPARATELY IDENTIFIED AND THEIR ENERGY MEASURED IN THE RANGE FROM 0.05 TO 10 MEV USING A LOW-ENERGY PARTICLE TELESCOPE. HOWEVER, SELECTION OF THE LOW-ENERGY TELESCOPE IS CONDITIONAL ON DEMONSTRATING THE PRODUCTION OF SUFFICIENTLY UNIFORM DETECTOR TO EFFECT THE SEPARATION OF THE NUCLEI IN THE LOW-ENERGY END OF THE PROPOSED INVESTIGATION RANGE (LESS THAN 1.4 MEV/NUCLEON).

----- NJS 773, LILLIE -----

EXPERIMENT NAME- MULTIFILTER PHOTOPOLARIMETER,
2200-7300 Å

NSSDC ID- MARN773-11

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.F. LILLIEU OF COLORADO
BOULDER, CO

OI - F.W. HORDU OF COLORADO
BOULDER, CO
OI - K. PANGU OF COLORADO
BOULDER, CO
OI - J.W. HANSENU OF ARIZONA
TUCSON, AZ
OI - D.L. COFFEENU OF ARIZONA
TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN 8-IN. F/11 TELESCOPE, WHICH WILL SEND ITS OBSERVATIONS THROUGH A POLARIZER, WHICH FILTER FOR ONE OF EIGHT BANDS IN THE 2200- TO 7300-Å SPECTRAL REGION, THEN ON TO A PHOTOMULTIPLIER TUBE. BY STUDY OF THESE EMISSION INTENSITY DATA, INFORMATION ON SURFACE TEXTURE AND COMPOSITION OF BOTH PLANETS (JUPITER AND SATURN) CAN BE OBTAINED, ALONG WITH INFORMATION OF SIZE DISTRIBUTION AND COMPOSITION OF SATURN'S RINGS, AND INFORMATION ON ATMOSPHERIC SCATTERING PROPERTIES AND DENSITY FOR BOTH PLANETS. MOLECULAR SCALE HEIGHTS FOR BOTH PLANETS CAN ALSO BE DETERMINED FROM THESE DATA.

----- NJS 778, NESS -----

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETERS

NSSDC ID- MARN778-05

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - N.F. NESSNASA-GSFC
GREENBELT, MD
OI - R.P. LEPPINGNASA-GSFC
GREENBELT, MD
OI - F.W. NEUBAUERBRAUNSCHWEIG TECH U
BRAUNSCHWEIG, FED REP OF GERMANY
OI - K.W. BEHANNONNASA-GSFC
GREENBELT, MD
OI - L.F. BURLAGANASA-GSFC
GREENBELT, MD
OI - M.H. ACUNANASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO INVESTIGATE THE MAGNETIC FIELDS OF JUPITER AND SATURN, THE SOLAR WIND INTERACTION WITH THE MAGNETOSPHERES OF THESE PLANETS, AND THE INTERPLANETARY MAGNETIC FIELD TO THE EXTENT OF THE SOLAR WIND BOUNDARY WITH THE INTERSTELLAR MAGNETIC FIELD, AND BEYOND, IF CROSSED. THE INVESTIGATION WILL BE CARRIED OUT USING TWO HIGH-FIELD AND TWO LOW-FIELD TRIAXIAL FLUXGATE MAGNETOMETERS. DATA ACCURACY OF THE INTERPLANETARY FIELDS WILL BE PLUS OR MINUS 0.1 GAMMA, AND THE RANGE OF MEASUREMENTS WILL BE FROM 0.01 GAMMA TO 20 GAUSS. THE INSTRUMENTATION WILL WEIGH 5.0 KG AND CONSUME 5.2 WATTS.

----- NJS 770, SCARF -----

EXPERIMENT NAME- PLASMA WAVE

NSSDC ID- MARN770-13

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.L. SCARFTRW SYSTEMS GROUP
REDONDO BEACH, CA
OI - D.A. GUNNETTU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL PROVIDE CONTINUOUS, SHEATH-INDEPENDENT MEASUREMENTS OF THE ELECTRON DENSITY PROFILES AT JUPITER AND SATURN. IT WILL ALSO GIVE BASIC INFORMATION ON LOCAL WAVE-PARTICLE INTERACTIONS REQUIRED TO CARRY OUT COMPARATIVE STUDIES OF THE PHYSICS OF THE JUPITER AND SATURN MAGNETOSPHERES. THE INVESTIGATION WILL CONSIST OF A 16-CHANNEL STEP FREQUENCY RECEIVER AND IT MAY INCLUDE LOW-FREQUENCY WAVEFORM RECEIVER WITH ASSOCIATED ELECTRONICS. THE FREQUENCY RANGE FOR THIS INSTRUMENT WILL BE FROM 10 HZ TO 56 KHZ. THIS INSTRUMENT WILL SHARE THE 10-M ANTENNAS BEING DEVELOPED FOR THE PLANETARY RADIO ASTRONOMY INVESTIGATION.

----- NJS 778, SMITH -----

EXPERIMENT NAME- TV PHOTOGRAPHY

NSSDC ID- MARN778-01

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.A. SMITHNEW MEXICO STATE U
LAS CRUCES, NM
OI - G.A. BRIGGSNASA-JPL
PASADENA, CA
OI - A.F. COOKSMITHSONIAN INST
WASHINGTON, DC
OI - G. DANIELSONNASA-JPL
PASADENA, CA
OI - M.F. DAVIESRAND CORP
SAITA MONICA, CA

01 - G.C. HUNTMETEOROLOGICAL OFFICE
DIDCOT, BERKSHIRE, UKING
01 - T. OWENSTATE U OF NEW YORK
BUFFALO, NY
01 - C. SAGANCORNELL U
ITHACA, NY
01 - L.A. SUDEROLMUS GEOLOGICAL SURVEY
FLAGSTAFF, AZ
01 - V.E. SUOMIU OF WISCONSIN
MADISON, WI

EXPERIMENT BRIEF DESCRIPTION

THE TV PHOTOGRAPHIC EXPERIMENT WILL USE A TWO-CAMERA SYSTEM, BASED ON THE MAGNIFIER Q TV SYSTEM. THIS SYSTEM WILL INCLUDE ONE NARROW-ANGLE, LONG FOCAL LENGTH CAMERA AND ONE WIDE-ANGLE, SHORT FOCAL LENGTH CAMERA. THE MAXIMUM RESOLUTION ACHIEVABLE WILL DEPEND GREATLY ON THE ACTUAL TRAJECTORY ON THIS MULTI-ENCOUNTER MISSION, BUT WILL BE AS HIGH AS 0.5 TO 1.0 KM ON THE CLOSEST APPROACHES. AT JUPITER AND SATURN, THE RESOLUTION WILL BE 20 KM AND 5 KM, RESPECTIVELY. THE OBJECTIVES OF THE EXPERIMENT WILL BE TO PHOTOGRAPH GLOBAL MOTIONS AND CLOUD DISTRIBUTIONS ON JUPITER AND SATURN, GROSS DYNAMICAL PROPERTIES, ZONAL ROTATION, ORIENTATION OF SPIN AXIS, ZONAL SHEAR, VERTICAL SHEAR, FLOW INSTABILITIES, SPOTS, AND SPECTRUM OF SCALE OF ATMOSPHERIC MOTIONS IN TIME AND SPACE. ADDITIONAL OBJECTIVES WILL INCLUDE THE STUDY OF THE MODE OF RELEASE OF INTERNAL ENERGY FLUX (SEARCH FOR CONVECTION CELLS AND ROLLS), STUDY OF GROWTH, DISSIPATION, MORPHOLOGY, AND VERTICAL STRUCTURE OF CLOUD COMPLEXES, GROSS OPTICAL PROPERTIES, GLOBAL AND LOCALIZED SCATTERING FUNCTION IN THE VISIBLE SPECTRUM, POLARIMETRY, NATURE OF CHROMOPHORES, THEIR STRUCTURE AND DEVELOPMENT, AND HIGH RESOLUTION OF THE GREAT RED SPOT. THE OBJECTIVES OF THE SATELLITE ENCOUNTERS WILL INCLUDE -- (1) GROSS CHARACTERISTICS -- SIZE, SHAPE, ROTATION, SPIN AXIS, CARTOGRAPHY, IMPROVED COORDINATES AND MASSES, (2) GEOLOGY -- MAJOR PHYSIOGRAPHIC PROVINCES, IMPACT AND VOLCANIC FEATURES, LINEAMENTS, POLAR CAPS, EROSION PROCESSES, AND LOW- AND HIGH-DENSITY SATELLITE COMPARATIVE STUDIES, DETECTION OF ATMOSPHERES, FOGS, AND LIND STRATIFICATION OF AEROSOLS, (3) SURFACE PROPERTIES -- COLORIMETRY, SCATTERING FUNCTION, NATURE OF BRIGHTNESS VARIATION (ESPECIALLY IAPETUS), AND SEARCH FOR NEW SATELLITES. STUDIES OF SATURN'S RINGS WILL BE CARRIED OUT. OBJECTIVES WILL INCLUDE -- (1) RESOLUTION OF INDIVIDUAL RING COMPONENTS OR CLUMPS OF MATERIAL, (2) VERTICAL AND RADIAL DISTRIBUTION OF MATERIAL OF VERY HIGH RESOLUTION, (3) SCATTERING FUNCTION, (4) COARSE POLARIMETRY, (5) OCCULTATION -- OPTICAL DEPTH, AND (6) DISTINGUISHING DIFFERENT TYPES OF MATERIAL IN THE RINGS. OTHER OBJECTIVES WILL BE TO SEARCH FOR NEW COMETS, ASTEROIDS, AND TARGETS OF OPPORTUNITY.

----- JWS 77B, VOGT -----

EXPERIMENT NAME- HIGH- AND MODERATELY LOW-ENERGY
COSMIC-RAY TELESCOPE

NSDOC ID- MARW77B-08

LAST REPORTED STATE- APPROV DITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.E. VOGTCALIF INST OF TECH
PASADENA, CA
OI - J.R. JOKIPIICALIF INST OF TECH
PASADENA, CA
OI - E.C. STONECALIF INST OF TECH
PASADENA, CA
OI - P.B. McDONALDNASA-GSFC
GREENBELT, MD
OI - B.W. YEEGARDENNASA-GSFC
GREENBELT, MD
OI - J.H. FRANKORNASA-GSFC
GREENBELT, MD
OI - W.H. WEBBERU OF NEW HAMPSHIRE
DURHAM, NH

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL STUDY THE ORIGIN AND ACCELERATION OF COSMIC RAYS, LIFE HISTORY, AND DYNAMIC CONTRIBUTION OF INTERSTELLAR COSMIC RAYS, THE NUCLEOSYNTHESIS OF ELEMENTS IN COSMIC RAY SOURCES, THE BEHAVIOR OF COSMIC RAYS IN THE INTERPLANETARY MEDIUM, AND THE THAWED PLANETARY ENERGETIC PARTICLE ENVIRONMENT. THE INSTRUMENTATION WILL INCLUDE A HIGH-ENERGY TELESCOPE SYSTEM (HETS) AND A LOW-ENERGY TELESCOPE SYSTEM (LETS). THE HETS WILL COVER AN ENERGY RANGE BETWEEN 6 AND 500 MEV/NUCLEON FOR NUCLEI RANGING IN ATOMIC NUMBERS FROM 1 THROUGH 30. IN ADDITION ELECTRONS IN THE ENERGY RANGE BETWEEN 3 AND 100 MEV/NUCLEON WILL BE MEASURED BY THIS TELESCOPE AND AN ELECTRON TELESCOPE (LET). THE LETS WILL MEASURE THE ENERGY AND DETERMINE THE IDENTITY OF NUCLEI FOR ENERGIES BETWEEN .15 AND 30 MEV/NUCLEON AND ATOMIC NUMBERS FROM 1 TO 30. THE INSTRUMENTS WILL ALSO MEASURE THE ANISOTROPIES OF ELECTRONS AND NUCLEI. THE WEIGHT AND POWER ALLOCATIONS FOR THIS INVESTIGATION WILL BE 5.2 KG AND 5.4 W.

----- JWS 77B, WARWICK -----

EXPERIMENT NAME- PLANETARY RADIO ASTRONOMY

NSDOC ID- MARW77B-10

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.W. WARWICKJ OF COLORADO
BOULDER, CO
OI - W.E. BROWNNASA-JPL
PASADENA, CA
OI - S. GULKISNASA-JPL
PASADENA, CA
OI - C.C. HARVEYPARIS OBSERVATORY
PARIS, FRANCE
OI - Y. LEGLANDPARIS OBSERVATORY
MEUDON, FRANCE
OI - D.H. STAELINMASS INST OF TECH
CAMBRIDGE, MA
OI - A. DISCHOTPARIS OBSERVATORY
MEUDON, FRANCE
OI - T.D. CARRU OF FLORIDA
GAINESVILLE, FL
OI - F.T. HADDOCKU OF MICHIGAN
ANN ARBOR, MI
OI - J.K. ALEXANDER, JR.NASA-GSFC
GREENBELT, MD
OI - R. PHILLIPSNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A SWEEP FREQUENCY RADIO RECEIVER OPERATING IN BOTH POLARIZATION STATES, BETWEEN 20 KHZ AND 40.5 MHZ. THE SIGNAL WILL BE RECEIVED BY A PAIR OF ORTHOGONAL 10-M MONOPOLE ANTENNAS. THE PHYSICS OF MAGNETOSPHERIC PLASMA RESONANCES AND NON-THERMAL RADIO EMISSIONS FROM THESE PLANETARY REGIONS WILL BE STUDIED BY INVESTIGATION OF THE RADIO EMISSION SIGNALS FROM JUPITER AND SATURN OVER THIS RANGE OF FREQUENCIES.

***** NIMBUS 4 *****

SPACECRAFT COMMON NAME- NIMBUS 4
ALTERNATE NAMES- NIMBUS-D, PL-701F
04362

NSDOC ID- 79-075A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 04/08/71.

LAUNCH DATE- 04/08/70 SPACECRAFT WEIGHT- 1449. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- THORAD-AGE

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-GA

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 107.1 MIN
PERIAPSIS- 10 0.00 KM ALT

EPOCH DATE- 09/04/70
INCLINATION- 99.9007 DEG
APOAPSIS- 1947.00 KM ALT

RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 107.12 MIN
PERIAPSIS- 1007.52 KM ALT

EPOCH DATE- 09/07/73
INCLINATION- 99.845 DEG
APOAPSIS- 1999.26 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - J. SARGENTNASA-GSFC
GREENBELT, MD
PS - W.H. NIDBERGNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

NIMBUS 4, THE FOURTH IN A SERIES OF SECOND-GENERATION METEOROLOGICAL R AND D SATELLITES, WAS DESIGNED TO SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METEOROLOGICAL DATA. THE POLAR-ORBITING SPACECRAFT CONSISTED OF THREE MAJOR STRUCTURES -- (1) A RING-SHAPED SENSOR MOUNT, (2) SOLAR PADDLES, AND (3) THE CONTROL HOUSING UNIT, WHICH WAS CONNECTED TO THE SENSOR MOUNT BY A TRUSS STRUCTURE, SHAPED SOMEWHAT LIKE AN OCEAN BUOY. NIMBUS 4 WAS NEARLY 3.7 M TALL, 1.5 M IN DIAMETER AT THE BASE, AND ABOUT 3 M ACROSS WITH SOLAR PADDLES EXTENDED. THE TORUS-SHAPED SENSOR MOUNT, WHICH FORMED THE SATELLITE BASE, HOUSED THE ELECTRONICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS RING PROVIDED A MOUNTING SPACE FOR SENSORS AND TELEMETRY ANTENNAS. AN M-FRAME STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS PROVIDED SUPPORT FOR THE LARGEST EXPERIMENTS AND WAS LOCATED ON TOP OF THE CONTROL HOUSING UNIT, WHICH WAS TAPERED TO THE TOP OF THE SPACECRAFT. WERE SUN SENSORS, HORIZON SCANNERS, GAS NOZZLES FOR ATTITUDE CONTROL, AND A COMMAND ANTENNA. USE OF AN ADVANCED ATTITUDE CONTROL SUBSYSTEM PERMITTED THE SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 1 DEG FOR ALL THREE AXES (PITCH, ROLL, AND YAW). PRIMARY EXPERIMENTS CONSISTED OF (1) AN IMAGE DISSIPATOR CAMERA SYSTEM (IDCS) FOR PROVIDING DAYTIME CLOUDCOVER PICTURES BOTH IN REAL-TIME AND RECORDED MODES, (2) A TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) FOR MEASURING DAYTIME AND NIGHTTIME SURFACE AND CLOUDTOP TEMPERATURES AS WELL AS THE WATER VAPOR CONTENT OF THE UPPER ATMOSPHERE, (3) AN INFRARED INTERFEROMETER SPECTROMETER (IRIS) FOR MEASURING THE EMISSION SPECTRA OF THE EARTH/ATMOSPHERE SYSTEM, (4) A SATELLITE INFRARED SPECTROMETER (SIRS) FOR DETERMINING THE VERTICAL PROFILES OF TEMPERATURE AND WATER VAPOR IN THE ATMOSPHERE, (5) A MONITOR OF ULTRAVIOLET SOLAR ENERGY (MUSE) FOR DETECTING SOLAR UV RADIATION, (6) A BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER FOR MONITORING THE VERTICAL DISTRIBUTION AND TOTAL AMOUNT OF ATMOSPHERIC OZONE ON A GLOBAL SCALE, (7) A FILTER WEDGE SPECTROMETER (FWS) FOR ACCURATE MEASUREMENT OF IR RADIANCE AS

A FUNCTION OF WAVELENGTH FROM THE EARTH/ATMOSPHERE SYSTEM. (8) A SELECTIVE CHOPPER RADIOMETER (SCR) FOR DETERMINING THE TEMPERATURES OF SIX SUCCESSIVE 10-KM LAYERS IN THE ATMOSPHERE FROM ABSORPTION MEASUREMENTS IN THE 15-MICRON CARBON DIOXIDE BAND. AND (9) AN INTERROGATION, RECORDING, AND LOCATION SYSTEM (IRLS) FOR LOCATING, INTERRUPTING, RECORDING, AND RETRANSMITTING METEOROLOGICAL AND GEOPHYSICAL DATA FROM REMOTE COLLECTION STATIONS. THE SPACECRAFT OPERATION WAS A SUCCESS, AND IT PERFORMED NORMALLY UNTIL APRIL 8, 1971, WHEN THE YAW GYRO FAILED, CAUSING THE SPACECRAFT TO FACE BACKWARDS IN ORBIT. IT WAS SUCCESSFULLY TURNED AROUND ON MAY 12, 1971. YAW PROBLEMS CONTINUED TO AFFECT THE SPACECRAFT THEREAFTER. THE THIS EXPERIMENT WAS PLACED IN AN OPERATIONAL OFF MODE ON FEBRUARY 2, 1972.

----- NIMBUS 4, COTE -----

EXPERIMENT NAME- INTERROGATION, RECORDING, AND LOCATION SYSTEM (IRLS)

NSSDC ID- 70-025A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 04/08/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.E. COTENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE NIMBUS 4 INTERROGATION, RECORDING, AND LOCATION SYSTEM (IRLS) EXPERIMENT WAS DESIGNED TO COLLECT AND RETRANSMIT METEOROLOGICAL, GEOPHYSICAL, AND OTHER EXPERIMENTAL DATA FROM REMOTE UNMANNED DATA COLLECTION STATIONS (PLATFORMS) DEPLOYED ON A GLOBAL SCALE. THE IRLS COULD ALSO DETERMINE THE LOCATION AND TRACK THE MOVEMENT OF SUCH PLATFORMS AS BALLOONS, OCEAN BUOYS, AND SHIPS TO WITHIN AN ACCURACY OF 2 KM. THE IRLS CONSISTED OF (1) A 466-MHZ RECEIVER, (2) A 401.5-MHZ TRANSMITTER, (3) DECODING AND CODING CIRCUITS, (4) A RANGE DETECTOR, AND (5) A 100-KB SATELLITE DATA MEMORY CAPABLE OF STORING DATA OBTAINED DURING EACH ORBIT FOR UP TO 370 DIFFERENT INTERROGATIONS. ON EACH ORBIT PASS, WHEN THE SATELLITE WAS WITHIN RANGE OF AN ACQUISITION AND COMMAND STATION, THE SATELLITE COMMAND MEMORY WAS PROGRAMMED TO COMMUNICATE WITH SELECTED PLATFORMS DURING THE COMING ORBIT. THE SATELLITE STORED BOTH THE ADDRESS (NUMBER) OF EACH PLATFORM AND THE DESIRED TIME THAT EACH SHOULD BE CONTACTED. AT THE APPROPRIATE TIME IN ORBIT, THE SATELLITE INTERROGATED EACH PLATFORM, MEASURED THE SATELLITE TO PLATFORM DISTANCE BY DETERMINING THE ROUND TRIP PROPAGATION TIME OF THE RF SIGNAL, RECEIVED THE ANALOG DATA FROM THE PLATFORM, CONVERTED IT TO DIGITAL FORM, AND STORED IT. UPON RETURN TO THE LOCALE OF THE GROUND STATION, THE STATION COMMANDED THE SATELLITE TO TRANSMIT THE STORED DATA AND TO ACCEPT NEW COMMANDS FOR THE NEXT ORBIT. THE EXPERIMENT WAS INITIALLY A SUCCESS -- HOWEVER, DUE TO SPACECRAFT YAW PROBLEMS, THE AMOUNT OF USEFUL DATA PRODUCED AFTER APRIL 1971 WAS EXTREMELY LIMITED. A LISTING OF IRLS TRACKING DATA FROM CONSTANT-LEVEL BALLOONS (30 AND 50 MB) APPEARS IN THE "NIMBUS 4 DATA CATALOG," VOLUME 4. COPIES OF COMPUTER OUTPUTS FROM INDIVIDUAL PLATFORM EXPERIMENTS ARE RETAINED AT THE NIMBUS/ATS DATA UTILIZATION CENTER, NASA-GSFC, GREENBELT, MD.

----- NIMBUS 4, HEATH -----

EXPERIMENT NAME- BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER

NSSDC ID- 70-025A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 06/09/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.F. HEATHNASA-GSFC
GREENBELT, MD
DI - J.V. DAVENATL CTR FOR ATMOS RES
DOULDER, CO
DI - A.J. KROEGERNASA-GSFC
GREENBELT, MD
DI - C.L. MATHERNATL CTR FOR ATMOS RES
DOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
THE NIMBUS 4 BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER EXPERIMENT WAS DESIGNED TO MONITOR THE VERTICAL DISTRIBUTION AND TOTAL AMOUNT OF ATMOSPHERIC OZONE ON A GLOBAL SCALE BY MEASURING THE INTENSITY OF ULTRAVIOLET RADIATION BACKSCATTERED BY THE EARTH/ATMOSPHERE SYSTEM DURING DAY AND NIGHT IN THE 2500- TO 3400-Å SPECTRAL BAND. THE PRIMARY INSTRUMENTATION CONSISTED OF A DOUBLE MONOCHROMATOR CONTAINING ALL REFLECTIVE OPTICS AND A PHOTOMULTIPLIER DETECTOR. THE DOUBLE MONOCHROMATOR WAS COMPOSED OF TWO FASTIE-EBERT-TYPE MONOCHROMATORS IN TANDEM. EACH MONOCHROMATOR HAD A 64- BY 64-MM GRATING WITH 2400 LINES PER MM. LIGHT FROM A 0.05-STER SOLID ANGLE (SUBTENDING APPROXIMATELY A 222-KM-SQUARE AREA ON THE EARTH'S SURFACE FROM A SATELLITE HEIGHT OF APPROXIMATELY 1100 KM) ENTERED THE RADII-PRINTING INSTRUMENT THROUGH A DEPOLARIZING FILTER. A MOTOR-DRIVEN CAM STEP ROTATED THE GRATINGS TO MONITOR THE INTENSITY OF 12 OZONE ABSORPTION WAVELENGTHS. THE DETECTOR WAS A PHOTOMULTIPLIER TUBE, FOR BACKGROUND READINGS, A FILTER PHOTOMETER MEASURED THE REFLECTED ULTRAVIOLET RADIATION IN AN OZONE FREE ABSORPTION AREA NEAR 3400 Å. SIGNALS FROM BOTH UNITS WERE READ BY

SEPARATE RANGE-SWITCHING ELECTROMETERS WITH SEVEN RANGES. THE BUV EXPERIMENT CYCLE REQUIRED 6144 SEC. EACH CYCLE, IN TURN, WAS DIVIDED INTO 192 BUV FRAMES OF 32-SEC DURATION. CALIBRATION BY ONBOARD LIGHT SOURCES WAS PERFORMED IN 26 OF THE 192 FRAMES. THE OTHER FRAMES WERE USED FOR EXPERIMENTAL DATA. DURING EACH OF THESE DATA FRAMES, THE MONOCHROMATOR MEASURED THE INTENSITY OF THE UV RADIATION IN EACH OF THE 12 WAVELENGTH BANDS WHILE THE PHOTOMETER MEASURED THE UV INTENSITY IN A SINGLE WAVELENGTH BAND. THE DWELL TIME AT EACH WAVELENGTH WAS 1.0 SEC. AND, DURING THIS INTERVAL, FOUR ANALOG UV INTENSITY MEASUREMENTS WERE TAKEN AT 400-MSEC INTERVALS IN ADDITION TO AN INTEGRATED PULSE COUNT MEASUREMENT OF THE UV INTENSITY AND ENERGETIC PARTICLE FLUX. ONCE EACH ORBIT, THE FIELD OF VIEW WAS CHANGED TO MONITOR THE SUN OR MOON DIRECTLY. THE MEASUREMENT RANGE OF THE SIGNAL CURRENT WAS FROM 0.2 TO 3000 MICROAMPS. THE VERTICAL DISTRIBUTION OF OZONE WAS OBTAINED BY MATHEMATICAL INVERSION TECHNIQUES. FOR A COMPLETE DESCRIPTION OF THE BUV EXPERIMENT, SEE SECTION 7 IN "THE NIMBUS IV USER'S GUIDE."

***** NIMBUS 5 *****

SPACECRAFT COMMON NAME- NIMBUS 5
ALTERNATE NAMES- NIMBUS-E, PL-7210
06305

NSSDC ID- 72-097A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 01/04/73.

LAUNCH DATE- 12/11/72 SPACECRAFT WEIGHT- 770. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SUPPORTING COUNTRY/AGENCY
UNITED STATES NASA-DA

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 12/11/72
ORBIT PERIOD- 107.16 MIN INCLINATION- 99.945 DEG
PERIAPSIS- 1089.52 KM ALT APDAPSIS- 1101.27 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 09/07/73
ORBIT PERIOD- 107.16 MIN INCLINATION- 99.933 DEG
PERIAPSIS- 1089.42 KM ALT APDAPSIS- 1101.33 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J. SARGENTNASA-GSFC
GREENBELT, MD
PS - W.P. NORDBERGNASA-GSFC
GREENBELT, MD
PS - J.S. THEONNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE NIMBUS 5 R AND D SATELLITE WAS DESIGNED TO SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METEOROLOGICAL AND GEOLOGICAL DATA ON A GLOBAL SCALE. THE POLAR-ORBITING SPACECRAFT CONSISTED OF THREE MAJOR STRUCTURES -- (1) A HOLLOW RING-SHAPED SENSOR MOUNT, (2) SOLAR PADDLES, AND (3) A CONTROL HOUSING UNIT THAT WAS CONNECTED TO THE SENSOR MOUNT BY A TRIPOD TRUSS STRUCTURE. CONFIGURED SOMEWHAT LIKE AN OCEAN BUOY, NIMBUS 5 WAS 11.7 M TALL, 1.5 M IN DIAMETER AT THE BASE, AND ABOUT 3 M WIDE WITH SOLAR PADDLES EXTENDED. THE SENSOR MOUNT, WHICH FORMED THE SATELLITE BASE, HOUSED THE ELECTRONICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS PROVIDED MOUNTING SPACE FOR SENSORS AND ANTENNAS. A BOX-BEAM STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS PROVIDED SUPPORT FOR THE LARGER SENSOR EXPERIMENTS. MOUNTED ON THE CONTROL HOUSING UNIT, WHICH WAS LOCATED ON TOP OF THE SPACECRAFT, WERE SUN SENSORS, HORIZON SCANNERS, AND A COMMAND ANTENNA. AN ADVANCED ATTITUDE CONTROL SYSTEM PERMITTED THE SPACECRAFT ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 1 DEG IN ALL THREE AXES. PRIMARY EXPERIMENTS INCLUDED (1) A TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR) FOR MEASURING DAY AND NIGHT SURFACE AND CLOUDTOP TEMPERATURES, AS WELL AS THE WATER VAPOR CONTENT OF THE UPPER ATMOSPHERE, (2) AN ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR) FOR MAPPING THE THERMAL RADIATION FROM THE EARTH'S SURFACE AND ATMOSPHERE, (3) AN INFRARED TEMPERATURE PROFILE RADIOMETER (ITPR) FOR OBTAINING VERTICAL PROFILES OF TEMPERATURE AND MOISTURE, (4) A MICROWAVE SPECTROMETER (NEMS) FOR DETERMINING TROPOSPHERIC TEMPERATURE PROFILES, ATMOSPHERIC WATER VAPOR ABUNDANCES, AND CLOUD LIQUID WATER CONTENTS, (5) A SELECTIVE CHOPPER RADIOMETER (SCR) FOR OBSERVING THE GLOBAL TEMPERATURE STRUCTURE OF THE ATMOSPHERE, AND (6) A SURFACE COMPOSITION MAPPING RADIOMETER (SCMR) FOR MEASURING THE DIFFERENCES IN THE THERMAL EMISSION CHARACTERISTICS OF THE EARTH'S SURFACE. TRANSMISSION OF USEFUL DATA FROM THE SCMR WAS TERMINATED ON JANUARY 4, 1973, AND THE ITPR IS OPERATING IN A RESTRICTED MODE.

----- NIMBUS 5, HOUGHTON -----

EXPERIMENT NAME- SELECTIVE CHOPPER RADIOMETER (SCR)

NSSDC ID- 72-097A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 12/11/72.

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.T. HOUGHTONOXFORD U
OXFORD, ENGLAND
OI - S.D. SMITHHERIOT-WATT U
EDINBURGH, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 5 SELECTIVE CHOPPER RADIOMETER (SCR) WAS DESIGNED TO (1) OBSERVE THE GLOBAL TEMPERATURE STRUCTURE OF THE ATMOSPHERE UP TO 50 KM IN ALTITUDE, (2) MAKE SUPPORTING OBSERVATIONS OF WATER VAPOR DISTRIBUTION, AND (3) DETERMINE THE DENSITY OF ICE PARTICLES IN CIRRUS CLOUDS, TO ACCOMPLISH THESE OBJECTIVES, THE SCR MEASURED EMITTED RADIATION IN 16 SPECTRAL INTERVALS SEPARATED INTO THE FOLLOWING FOUR GROUPS -- (1) FOUR CARBON DIOXIDE CHANNELS BETWEEN 13.0 AND 14.0 MICRONS, (2) AN IR WINDOW CHANNEL AT 11.1 MICRONS AND A WATER VAPOR CHANNEL AT 10.6 MICRONS, (3) TWO CHANNELS AT 49.5 AND 133.3 MICRONS, AND (4) CHANNELS AT 2.08, 2.59, 2.65, AND 3.5 MICRONS. FROM AN AVERAGE SATELLITE ALTITUDE OF 1100 KM, THE RADIOMETER VIEWED A 48-KM CIRCLE ON THE EARTH'S SURFACE WITH A GROUND RESOLUTION OF ABOUT 13 KM AT NADIR. THE REDUCED TEMPERATURE FIELDS HAD AN ACCURACY OF ABOUT PLUS OR MINUS 1 DEG C. A SIMILAR EXPERIMENT WAS FLOWN ON NIMBUS 4.

----- NIMBUS 5, MCCULLOCH -----

EXPERIMENT NAME- TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR)

NSSDC ID- 72-097A-08

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 12/11/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - A.W. MCCULLOCHNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 5 TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) WAS DESIGNED TO DETECT EMITTED THERMAL RADIATION IN BOTH THE 10.5- TO 12.5-MICRON REGION (IR WINDOW) AND THE 5.0- TO 7.0-MICRON REGION (WATER VAPOR). THE WINDOW CHANNEL MEASURED CLOUDTOP TEMPERATURES AND WAS CAPABLE OF PRODUCING CLOUDCOVER AND THERMAL GRADIENTS ON LAND AND WATER SURFACES IN CLOUD-FREE AREAS DURING BOTH THE DAY AND NIGHT PORTIONS OF THE ORBIT. THE OTHER CHANNEL OPERATED PRIMARILY AT NIGHT TO MAP THE WATER VAPOR DISTRIBUTION IN THE UPPER TROPOSPHERE AND STRATOSPHERE. SENSOR DATA FROM THESE TWO CHANNELS WERE PRIMARILY USED TO SUPPORT THE OTHER, MORE SOPHISTICATED METEOROLOGICAL EXPERIMENTS ON BOARD NIMBUS 5. THE INSTRUMENT CONSISTED OF A 12.7-CM CASSEGRAIN SYSTEM, A SCANNING MIRROR COMMON TO BOTH CHANNELS, A BEAM SPLITTER, FILTERS, AND TWO GERMANIUM-IMMERSED THERMISTOR BOLOMETERS. IN CONTRAST TO TV, NO IMAGE WAS FORMED WITHIN THE RADIOMETER. INCOMING RADIANT ENERGY WAS COLLECTED BY A FLAT SCANNING MIRROR INCLINED AT 45 DEG TO THE OPTICAL AXIS. THE MIRROR ROTATED AT 40 RPM AND SCANNED IN A PLANE PERPENDICULAR TO THE SPACECRAFT VELOCITY. THE ENERGY WAS FOCUSED ON A DICHROMATIC BEAM SPLITTER, WHICH DIVIDED THE ENERGY SPECTRALLY AND SPATIALLY INTO THE TWO CHANNELS. BOTH CHANNELS OF THE THIR SENSOR TRANSFORMED THE RECEIVED RADIATION INTO AN ELECTRIC OUTPUT (VOLTAGES), WHICH WAS RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION. A SIMILAR EXPERIMENT IS PLANNED FOR NIMBUS-F.

----- NIMBUS 5, SMITH -----

EXPERIMENT NAME- INFRARED TEMPERATURE PROFILE RADIOMETER (ITPR)

NSSDC ID- 72-097A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/04/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - W.L. SMITHNOAA-NES,
SUITLAND, MD
OI - D.O. MARKNOAA-NES,
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 5 INFRARED TEMPERATURE PROFILE RADIOMETER (ITPR) EXPERIMENT WAS DESIGNED TO TEST THE FEASIBILITY AND OPERATIONAL APPLICATIONS OF A REMOTE SOUNDING TECHNIQUE USING SIMULTANEOUS MEDIUM-RESOLUTION (32 KM) MEASUREMENTS IN NINE SPECTRAL INTERVALS. THE RADIOMETER SENSED SIX INTERVALS IN THE 15-MICRON CARBON DIOXIDE BAND, ONE INTERVAL IN THE WATER VAPOR ROTATIONAL BAND NEAR 20 MICRONS, AND TWO SPECTRAL INTERVALS IN THE ATMOSPHERIC WINDOW REGIONS NEAR 3.8 AND 11 MICRONS. THE ITPR VIEWED THE EARTH SUCCESSIVELY AT VARIOUS ANGLES DISTRIBUTED SYMMETRICALLY ABOUT NADIR IN A PLANE NORMAL TO THE ORBITAL TRACK. FORTY-TWO GEOGRAPHICALLY INDEPENDENT SCAN SPOTS WERE TAKEN ALONG A SINGLE STRIP. AS THE SATELLITE PROGRESSED ALONG ITS ORBITAL PATH, THE RADIOMETER OBSERVED 10 SUCH "42-SPOT" STRIPS TO FORM A 42 BY 10 MATRIX OF INDEPENDENT SCAN SPOTS. EACH MATRIX WAS PRODUCED IN 222 SEC WITH THE WHOLE SCANNING SEQUENCE REPEATED EVERY 240 SEC. THE MATRIX DATA WERE RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION. MATRIX MEASUREMENTS TAKEN IN THE CARBON DIOXIDE AND WATER VAPOR ABSORPTION BANDS WERE USED TO CALCULATE TEMPERATURE PROFILES AND TOTAL WATER VAPOR CONTENT IN THE TROPOSPHERE AND LOWER STRATOSPHERE. THE TWO WINDOW

MEASUREMENTS HELPED TO DETECT AND ELIMINATE CLOUD CONTAMINATION OF THE RADIANCES, THUS PERMITTING ACTUAL DETERMINATION OF PROFILES DOWN TO THE EARTH'S SURFACE IN ALL BUT COMPLETELY OVERCAST AREAS. THE RADIOMETER WAS INITIALLY SUCCESSFUL, BUT AFTER APPROXIMATELY 50 ORBITS THE SCAN MOTION BECAME ERRATIC. AS OF JANUARY 1973, THE RADIOMETER WAS OPERATING BUT WITH ONLY 40 PERCENT OF ITS NORMAL SCAN CYCLE.

----- NIMBUS 5, STAELIN -----

EXPERIMENT NAME- NIMBUS 5 MICROWAVE SPECTROMETER (NEMS)

NSSDC ID- 72-097A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 12/11/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.H. STAELINMASS INST OF TECH
CAMBRIDGE, MA

OI - F.T. BARATHNASA-JPL
PASADENA, CA
OI - N.E. GAUTENVIRON RES + TECH INC
STAMFORD, CT
OI - W.P. NORDBERGNASA-GSFC
GREENBELT, MD
OI - P. THADDEUSNASA-GISS
NEW YORK, NY
OI - W.B. LENOIRNASA-JSC
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS 5 MICROWAVE SPECTROMETER (NEMS) WAS DESIGNED PRIMARILY TO DEMONSTRATE THE CAPABILITIES AND LIMITATIONS OF MICROWAVE SENSORS FOR MEASURING TROPOSPHERIC TEMPERATURE PROFILES, WATER VAPOR ABUNDANCES, CLOUD LIQUID WATER CONTENT, AND EARTH SURFACE TEMPERATURES. A SECONDARY PURPOSE WAS TO OBTAIN SUCH DATA FOR WEATHER PREDICTION PURPOSES. THE NEMS COULD CONTINUOUSLY MONITOR EMITTED THERMAL RADIATION AT WAVELENGTHS OF 11.1, 9.55, 5.50, 5.46, AND 5.10 MM. THE THREE CHANNELS NEAR THE 5-MM OXYGEN ABSORPTION BAND WERE USED PRIMARILY TO DETERMINE THE ATMOSPHERIC TEMPERATURE PROFILE. NEMS WOULD PROVIDE MEASUREMENTS FOR USE IN DERIVING TEMPERATURE PROFILE EVEN IN CLOUDCOVER CONDITIONS THAT NORMALLY RESTRICT THE USEFULNESS OF CONVENTIONAL IR DATA IN SUCH SITUATIONS. THE TWO WATER VAPOR CHANNELS NEAR 10 MM PERMITTED THE WATER VAPOR AND CLOUD LIQUID WATER CONTENT OVER OCEANS TO BE ESTIMATED AND ALSO YIELDED AN ESTIMATED TEMPERATURE ONCE THE SURFACE EMISSIVITY HAD BEEN CALIBRATED BY COMPARISON WITH DIRECT MEASUREMENTS. THE THREE OXYGEN CHANNELS SHARED A COMMON SIGNAL AND REFERENCE ANTENNA. BOTH WATER VAPOR CHANNELS HAD THEIR OWN SIGNAL AND REFERENCE ANTENNAS. FROM AN AVERAGE SATELLITE HEIGHT OF 1100 KM, THE NEMS VIEWED A 100-KM CIRCLE ON THE EARTH'S SURFACE. NEMS DATA WERE RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION. A SOMEWHAT SIMILAR EXPERIMENT IS PLANNED FOR NIMBUS-F.

----- NIMBUS 5, WILHEIT, JR. -----

EXPERIMENT NAME- ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR)

NSSDC ID- 72-097A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 12/11/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - T.T. WILHEIT, JR.NASA-GSFC
GREENBELT, MD

OI - P. GLOENSENNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE PRIMARY OBJECTIVES OF THE NIMBUS 5 ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR) WERE (1) TO DERIVE THE LIQUID WATER CONTENT OF CLOUDS FROM BRIGHTNESS TEMPERATURES OVER OCEANS, (2) TO OBSERVE DIFFERENCES BETWEEN SEA ICE AND THE OPEN SEA OVER THE POLAR CAPS, AND (3) TO TEST THE FEASIBILITY OF INFERRING SURFACE COMPOSITION AND SOIL MOISTURE. TO ACCOMPLISH THESE OBJECTIVES, THE ESMR WAS CAPABLE OF CONTINUOUS GLOBAL MAPPING OF THE 1.55-CM (19.36 GHz) RADIO THERMAL (MICROWAVE) RADIATION EMITTED BY THE EARTH/ATMOSPHERE SYSTEM AND COULD FUNCTION EVEN IN THE PRESENCE OF CLOUDS. CONDITIONS THAT BLOCK CONVENTIONAL SATELLITE INFRARED SENSORS. A 90- BY 90-CM RADIOMETER ANTENNA SYSTEM, DEPLOYED AFTER A LAUNCH, SCANNED THE EARTH SUCCESSIVELY AT VARIOUS ANGLES IN A PLANE PERPENDICULAR TO THE SPACECRAFT ORBITAL TRACK, PRODUCING A BRIGHTNESS TEMPERATURE MAP OF THE SURFACE OF THE EARTH AND ITS ATMOSPHERE. THE SCANNING PROCESS WAS CONTROLLED BY A COMPUTER ON BOARD AND CONSISTED OF 70 SYNTHETICALLY DISTRIBUTED INDEPENDENT SCAN SPOTS EXTENDING 50 DEG IN EITHER SIDE OF NADIR. ANGULAR SEPARATION OF THE SCAN SPOTS ALLOWED FOR AN 8.5 PERCENT OVERLAP BETWEEN 11 W POSITIONS. FROM A MEAN ORBITAL HEIGHT OF 1100 KM, THE RADIOMETER HAD AN ACCURACY OF ABOUT PLUS OR MINUS 1 DEG C WITH A SPATIAL RESOLUTION OF ABOUT 25 KM. THE ESMR DATA WERE STORED ON MAGNETIC TAPE FOR TRANSMISSION TO GROUND ACQUISITION STATIONS. A SIMILAR EXPERIMENT WILL BE FLOWN ON NIMBUS-F.

***** NIMBUS-F *****

SPACECRAFT COMMON NAME- NIMBUS-F
ALTERNATE NAMES- PL-7310
NSSDC ID- NIMBUS-F

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 10/00/75 SPACECRAFT WEIGHT- 585. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DA

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 108. MIN
PERIAPSIS- 1100.00 KM ALT INCLINATION- 100. DEG
APHELIUM- 1100.00 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J. SARGENTNASA-GSFC
GREENBELT, MD
PS - W.P. NORDBERGNASA-GSFC
GREENBELT, MD
PS - J.S. THEONNASA-GSFC
GREENBELT, MD
PS - W.R. BANDEENNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE NIMBUS-F R AND D SATELLITE WILL SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METEOROLOGICAL DATA ON A GLOBAL SCALE. THE POLAR-ORBITING SPACECRAFT WILL CONSIST OF THREE MAJOR STRUCTURES -- (1) A HOLLOW TORUS-SHAPED SENSOR MOUNT, (2) SOLAR PADDLES, AND (3) A CONTROL HOUSING UNIT THAT IS CONNECTED TO THE SENSOR MOUNT BY A TRIPOD TRUSS STRUCTURE. CONFIGURED SOMEWHAT LIKE AN OCEAN BUOY, NIMBUS-F WILL BE NEARLY 3.7 M TALL, 1.5 M IN DIAMETER AT THE BASE, AND ABOUT 3 M WIDE WITH SOLAR PADDLES EXTENDED. THE SENSOR MOUNT THAT FORMS THE SATELLITE BASE WILL HOUSE THE ELECTRONICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS WILL PROVIDE MOUNTING SPACE FOR SENSORS AND ANTENNAS. A BOX-JEAN STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS WILL PROVIDE SUPPORT FOR THE LARGER SENSOR EXPERIMENTS. MOUNTED ON THE CONTROL HOUSING UNIT, WHICH WILL BE LOCATED ON TOP OF THE SPACECRAFT, WILL BE SUN SENSORS, HORIZON SCANNERS, AND A COMMAND ANTENNA. AN ADVANCED ATTITUDE CONTROL SYSTEM WILL PERMIT THE SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN PLUS OR MINUS 1 DEG IN ALL THREE AXES (PITCH, ROLL, AND YAW). NINE EXPERIMENTS HAVE BEEN SELECTED FOR NIMBUS-F. THEY ARE THE (1) EARTH RADIATION BUDGET (ERB), (2) ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR), (3) HIGH-RESOLUTION INFRARED RADIATION SOUNDER (HIRS), (4) LIND RADIANCE INVERSION RADIOMETER (LRIR), (5) PRESSURE MODULATED RADIOMETER (PMR), (6) SCANNING MICROWAVE SPECTROMETER (SCMS), (7) TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR), (8) SATELLITE TRACKING AND DATA RELAY EXPERIMENT, AND (9) TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE). THIS COMPLEMENT OF ADVANCED SENSORS WILL BE CAPABLE OF (1) MAPPING TROPOSPHERIC TEMPERATURE, WATER VAPOR ABUNDANCE, AND CLOUD WATER CONTENT, (2) PROVIDING VERTICAL PROFILES OF TEMPERATURE, OZONE, AND WATER VAPOR, (3) TRANSMITTING REAL-TIME DATA TO A GROUNDSTATION SPACECRAFT (ATS-F), AND (4) YIELDING DATA ON THE EARTH'S RADIATION BUDGET.

----- NIMBUS-F, BANDEEN -----

EXPERIMENT NAME- TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR)

NSSDC ID- NIMBUS-F-12

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - W.R. BANDEENNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) WILL DETECT EMITTED THERMAL RADIATION IN BOTH THE 10.5- TO 12.5-MICRON REGION (IR WINDOW) AND THE 6.5- TO 7.0-MICRON REGION (WATER VAPOR). THE WINDOW CHANNEL WILL MEASURE CLOUDTOP TEMPERATURES AND WILL BE CAPABLE OF PRODUCING HIGH-RESOLUTION PICTURES OF CLOUDCOVER AND THERMAL GRADIENTS ON LAND AND WATER SURFACES IN CLOUD-FREE AREAS DURING BOTH THE DAY AND NIGHT PORTIONS OF THE ORBIT. THE OTHER CHANNEL WILL OPERATE PRIMARILY AT NIGHT TO MAP THE WATER VAPOR DISTRIBUTION IN THE UPPER TROPOSPHERE AND STRATOSPHERE. SENSORY DATA FROM THESE TWO CHANNELS WILL PRIMARILY BE USED TO SUPPORT OTHER, MORE SOPHISTICATED, METEOROLOGICAL EXPERIMENTS ON BOARD NIMBUS-F. THE INSTRUMENT WILL CONSIST OF A 12.7-CM CASSEGRAIN SYSTEM AND SCANNING MIRROR COMMON TO BOTH CHANNELS, A BEAM SPLITTER, FILTERS, AND TWO GERMANIUM-IMMERSED THERMISTOR BOLOMETERS. IN CONTRAST TO TV, NO IMAGE IS FORMED WITHIN THE RADIOMETER. INCOMING RADIANT ENERGY WILL BE COLLECTED BY A FLAT SCANNING MIRROR INCLINED AT 45 DEG TO THE OPTICAL AXIS. THE MIRROR WILL ROTATE THROUGH 360 DEG AT 48 RPM AND WILL SCAN IN A PLANE NORMAL TO THE SPACECRAFT VELOCITY. THE ENERGY WILL THEN BE FOCUSED ON A DISCRIMINATE BEAM SPLITTER WHICH WILL DIVIDE THE ENERGY SPECTRALLY AND SPATIALLY INTO THE TWO CHANNELS. BOTH CHANNELS OF THE THIR SENSOR WILL TRANSFORM THE RECEIVED

RADIATION INTO ELECTRIC OUTPUT (VOLTAGES), WHICH WILL BE RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION.

----- NIMBUS-F, GILLE -----

EXPERIMENT NAME- LIND RADIANCE INVERSION RADIOMETER (LRIR)

NSSDC ID- NIMBUS-F-04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.C. GILLENATL CTR FOR ATMOS RES
BOULDER, CO
OI - F.B. HOUSEDREXEL INST OF TECH
PHILADELPHIA, PA
OI - R.C. CRAIGFLORIDA STATE U
TALLAHASSEE, FL
OI - J.C. BATESHONEYWELL, INC
ST. PETERSBURG, FL

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F LIND RADIANCE INVERSION RADIOMETER (LRIR) WILL PROVIDE CALIBRATED RADIANCE VERSUS ALTITUDE PROFILES BY INTERCEPTING RADIATION EMANATING FROM AN ATMOSPHERIC PATH WHICH IS TANGENTIAL TO A PARTICULAR GEOCENTRIC HEIGHT. THE LRIR WILL SENSE RADIATION IN FOUR SPECTRAL INTERVALS -- (1) THE 14.0- TO 15.0-MICRON CARBON DIOXIDE BAND, (2) THE 14.2- TO 17.3-MICRON CARBON DIOXIDE BAND, (3) THE 6.0- TO 10.1-MICRON OZONE BAND, AND (4) THE 20- TO 25-MICRON WATER VAPOR ROTATIONAL BAND. MEASUREMENTS TAKEN IN THE TWO CARBON DIOXIDE CHANNELS AND THE WATER VAPOR CHANNEL WILL BE USED TO CALCULATE GLOBAL TEMPERATURE AND WATER VAPOR PROFILES IN THE STRATOSPHERE AND LOWER MESOSPHERE. IN ADDITION, VALUES OF THE GEOSTROPHIC WIND UP TO 1 MB (APPROXIMATELY 40 KM) WILL BE DERIVED ANALYTICALLY FROM THE DEDUCED TEMPERATURE PROFILES. THE RADIOMETER WILL INCLUDE AN OPTICAL SYSTEM, A SCANNING MIRROR, CHOPPERS, AND ASSOCIATED ELECTRONICS, AND WILL EMPLOY AN AMMONIA-METHANE COOLER SYSTEM FOR THREE OF THE FOUR DETECTOR CHANNELS. THE DEDUCED TEMPERATURE PROFILES WILL HAVE AN RMS ACCURACY OF PLUS OR MINUS 3 DEG AT HEIGHTS ABOVE 15 KM, WHILE THE VALUES FOR OZONE WILL BE ACCURATE TO WITHIN PLUS OR MINUS 20 PERCENT AT 1 MB. WATER VAPOR VALUES AT THE SAME HEIGHT SHOULD BE WITHIN 50 PERCENT.

----- NIMBUS-F, HOUGHTON -----

EXPERIMENT NAME- PRESSURE-MODULATED RADIOMETER (PMR)

NSSDC ID- NIMBUS-F-09

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.L. HOUGHTONOXFORD U
OXFORD, ENGLAND
OI - C.O. RODGERSOXFORD U
OXFORD, ENGLAND
OI - E.J. WILLIAMSONOXFORD U
OXFORD, ENGLAND
OI - G.O. PESKETTOXFORD U
OXFORD, ENGLAND
OI - P. CURTISOXFORD U
OXFORD, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F PRESSURE MODULATED RADIOMETER (PMR) EXPERIMENT WILL TAKE RADIOMETRIC MEASUREMENTS IN THE 15-MICRON CARBON DIOXIDE BAND AT ALTITUDES BETWEEN 45 AND 70 KM ON A GLOBAL SCALE. BY APPROPRIATE MATHEMATICAL RETRIEVAL METHODS, THE TEMPERATURE STRUCTURE OF THE UPPER STRATOSPHERE AND LOWER MESOSPHERE WILL THEN BE DEDUCED. THE PRESSURE MODULATION TECHNIQUE WILL PERMIT THE EXTENSION OF SELECTIVE CHOPPING TECHNIQUES TO HIGHER ALTITUDES WHERE THE PRESSURE-BROADENED EMISSION LINES IN THE 15-MICRON CARBON DIOXIDE BAND BECOME SO NARROW THAT CONVENTIONAL SPECTROMETERS AND INTERFEROMETERS HAVE INSUFFICIENT SPECTRAL RESOLUTION. IN ADDITION TO PRESSURE SCANNING (IN DISCRETE STEPS), THE RADIOMETER WILL ALSO EMPLOY CHOPPER SCANNING ALONG THE DIRECTION OF FLIGHT. THE PMR WILL COMBINE TWO SIMILAR RADIOMETER CHANNELS, EACH CONSISTING OF A PLANE SCANNING MIRROR, REFERENCE BLACKBODY, PRESSURE MODULATOR CELL, AND DETECTOR ASSEMBLY. THE PLANE MIRROR WILL BE GOLD-COATED AND MOUNTED AT 45 DEG ON A 90-DEG STEPPING MOTOR SO THAT THE FIELD OF VIEW OF THE CHANNEL MAY BE DIRECTED TO SPACE OR TO THE INTERNAL REFERENCE BLACKBODY FOR INFILIGHT RANGE AND ZERO CALIBRATION. THE MOTOR WILL BE MOUNTED ON A PAIR OF FLEXIBLE PIVOTS SO THAT THE MIRROR CAN BE ROTATED THROUGH PLUS OR MINUS 7+1/2 DEG FROM ITS REST POSITION TO GIVE THE REQUIRED DOPPLER SCAN. MAJOR COMPONENTS IN THE PRESSURE MODULATOR CELL WILL BE A MOVABLE PISTON, DIAPHRAGM, AND MAGNETIC DRIVE COIL. THE DETECTOR ASSEMBLY WILL CONSIST OF A FIELD LENS, A CONDENSING LIGHT PIPE, AND A PYROELECTRIC FLAKE BOLOMETER. EACH RADIOMETER WILL HAVE A FIELD OF VIEW THAT IS 20 DEG HALF ANGLE ACROSS THE SPACECRAFT'S LINE OF FLIGHT AND 40 DEG HALF ANGLE PARALLEL TO THE LINE OF FLIGHT. THE DEDUCED TEMPERATURE VALUES SHOULD BE WITHIN PLUS OR MINUS 2 DEG K AT 65 KM AND ABOUT PLUS OR MINUS 0.2 DEG K NEAR 50 KM.

----- NIMBUS-F, KELLOGG -----

EXPERIMENT NAME- TROPICAL WIND ENERGY CONVERSION AND
REFERENCE LEVEL EXPERIMENT (TWERLE)

NSDDC ID- NIMBUS-F-01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.W. KELLOGG NATL CTR FOR ATMOS RES
BOULDER, CO
OI - P. JULIAN NATL CTR FOR ATMOS RES
BOULDER, CO
OI - V.E. SUOMI U OF WISCONSIN
MADISON, WI
OI - C.R. LAUGHLIN NASA-GSFC
GREENBELT, MD
OI - R.L. TALLEY PROGRAM METHODS, INC
SILVER SPRING, MD
OI - W.R. DANDEEN NASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE GOALS OF THE NIMBUS-F TROPICAL WIND ENERGY
CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) WILL BE
CLOSELY ASSOCIATED WITH THE OBJECTIVES OF GARP AND WILL
INCLUDE (1) MEASURING UPPER ATMOSPHERIC WINDS OVER REMOTE
REGIONS, (2) STUDYING THE RELATIVE AIR MOTION ALONG ISOBARIC
SURFACES TO DETERMINE THE RATE OF CONVERSION OF ATMOSPHERIC
POTENTIAL ENERGY INTO KINETIC ENERGY, AND (3) PROVIDING DIRECT
MEASUREMENTS OF VARIOUS METEOROLOGICAL PARAMETERS THAT CAN
SERVE AS REFERENCE POINTS IN ADJUSTING INDIRECT TEMPERATURE
SOUNDINGS MADE FROM SATELLITES. THE EXPERIMENT WILL CONSIST OF
TWO BASIC COMPONENTS - (1) APPROXIMATELY 300 CONSTANT LEVEL
METEOROLOGICAL BALLOONS TO YIELD MEASUREMENTS OF WINDS,
TEMPERATURE, AND PRESSURE IN THE TROPICS AND AT SOUTHERN
HEMISPHERE MIDLATITUDES AT 150 MB (ABOUT 13.6-KM ALTITUDE),
AND (2) THE NIMBUS-F RANDOM ACCESS MEASUREMENTS SYSTEM (RAMS)
TO PROVIDE DATA COLLECTION AND LOCATION DETERMINATIONS FROM
THE BALLOONS. THE 3.5-M-DIAM POLYESTER-HYLAR BALLOONS WILL BE
EQUIPPED WITH A TRANSMITTER PACKAGE, SOLAR POWER SUPPLY,
DIGITIZER/MODULATOR, AND SENSORS. THE SENSORS WILL CONSIST OF
A RADIO ALTIMETER THAT WILL HAVE AN ACCURACY OF BETTER THAN
PLUS OR MINUS 20 M, A HEAD THERMISTOR THAT WILL MONITOR THE
AMBIENT AIR TEMPERATURE TO AN ACCURACY OF PLUS OR MINUS 0.5
DEG C, AND A PRESSURE SENSOR TO MEASURE THE 150-MB FLIGHT
ALTITUDE TO AN ACCURACY OF PLUS OR MINUS 0.3 MB. A MAGNETIC
CUTDOWN DEVICE WILL ALSO BE INCLUDED ON EACH BALLOON TO
ELIMINATE ANY ACCIDENTAL OVERFLIGHTS INTO REGIONS OF THE
NORTHERN HEMISPHERE NORTH OF 20 DEG N LATITUDE. THE RAMS ON
BOARD THE SPACECRAFT WILL HAVE NO COMMAND OR CONTROL
CAPABILITY OVER THE BALLOONS (THE BALLOONS WILL NOT BE
INTERROGATED). IT WILL MERELY DETECT EACH BALLOON SIGNAL
(401.2 MHZ) AND EXTRACT THE CARRIER FREQUENCY, BALLOON
IDENTIFICATION, AND SENSOR DATA. THIS INFORMATION, ALONG WITH
TIME REFERENCES, WILL BE STORED IN DIGITAL FORM FOR SUBSEQUENT
RELAY TO A GROUND ACQUISITION STATION. THE BALLOON'S POSITION
AND VELOCITY WILL BE DERIVED FROM THE RELATIVE MOTION BETWEEN
THE PLATFORM AND THE SATELLITE BY MEASURING DOPPLER SHIFTS IN
THE CARRIER SIGNAL RECEIVED FROM THE BALLOON. WHILE WILL BE
CAPABLE OF A LOCATION ACCURACY OF 1 KM AND A PLATFORM VELOCITY
ACCURACY OF 1 M/SEC.

----- NIMBUS-F, MCCULLOCH -----

EXPERIMENT NAME- HIGH RESOLUTION INFRARED RADIATION
SOUNDER (HIRS)

NSDDC ID- NIMBUS-F-02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.W. MCCULLOCH NASA-GSFC
GREENBELT, MD
OI - W.L. SMITH NOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION
THE NIMBUS-F HIGH-RESOLUTION INFRARED RADIATION SOUNDER
(HIRS) WILL SUPPORT THE GARP DATA TEST SET BY PROVIDING
VERTICAL TEMPERATURE PROFILES TWICE DAILY ON A GLOBAL BASIS,
EXTENDING UP TO APPROXIMATELY 40 KM, AND INFORMATION ON THE
WATER VAPOR DISTRIBUTION IN THE TROPOSPHERE. THE HIRS WILL
MEASURE RADIANCES PRIMARILY IN FIVE SPECTRAL REGIONS - (1)
SEVEN CHANNELS NEAR THE 15-MICRON CARBON DIOXIDE ABSORPTION
BAND, (2) TWO CHANNELS IN THE IR WINDOW, 11.1 AND 3.7 MICRONS,
AND (3) TWO CHANNELS IN THE WATER VAPOR ABSORPTION BAND, 6.2 AND
6.7 MICRONS. (4) FIVE CHANNELS IN THE 4.3-MICRON CARBON
DIOXIDE BAND AND (5) ONE CHANNEL IN THE VISIBLE, 0.69-MICRON
REGION. THE SOUNDER WILL CONSIST OF A CASSEGRAIN TELESCOPE,
SCANNING MIRROR, DICHROMATIC BEAM SPLITTER, FILTER WHEEL,
CHOPPER, AND ASSOCIATED ELECTRONICS. THE HIRS WILL SCAN THE
EARTH'S SURFACE IN A PLANE NORMAL TO THE SPACECRAFT'S ORBITAL
PATH WITH A MAXIMUM SCAN ANGLE OF 30 DEG TO EITHER SIDE OF
NADIR.

----- NIMBUS-F, SMITH -----

EXPERIMENT NAME- EARTH RADIATION BUDGET (ERB)

NSDDC ID- NIMBUS-F-03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.L. SMITH NOAA-NESS
SUITLAND, MD
OI - A.J. DRUMMOND EPPLBY LAB, INC
NEWPORT, RI
OI - J. RUFF NOAA-NESS
SUITLAND, MD
OI - J.P. HICKEY EPPLBY LAB, INC
NEWPORT, RI
OI - W.J. SCHOLLES EPPLBY LAB, INC
NEWPORT, RI
OI - D.T. HILLEARY NOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F EARTH RADIATION BUDGET (ERB) EXPERIMENT
WILL (1) MEASURE REFLECTED AND EMITTED TERRESTRIAL RADIATION
FLUXES IN CONJUNCTION WITH SOLAR RADIATION FOR DETERMINATION
OF THE EARTH RADIATION BUDGET, (2) DETERMINE THE ANGULAR
DISTRIBUTION OF TERRESTRIAL RADIATION FOR VARIOUS
METEOROLOGICAL AND GEOGRAPHIC REGIMES, AND (3) CORRELATE
MEASUREMENTS MADE USING IDENTICAL BUT INDEPENDENT CHANNELS
CALIBRATED TO THE SAME STANDARD. INCOMING SOLAR RADIATION FROM
0.2 TO 50 MICRONS WILL NORMALLY BE MONITORED IN 10 SPECTRAL
INTERVALS SEVERAL TIMES EACH DAY AND EVERY 3000 HOURS DURING
PERIODS OF SOLAR ACTIVITY. TERRESTRIAL RADIATION MEASUREMENTS
WILL BE TAKEN CONTINUOUSLY IN 12 SPECTRAL INTERVALS ALSO FROM
0.2 TO 50 MICRONS. THE MEASUREMENTS WILL BE TAKEN IN TWO WAYS.
FOUR CHANNELS USING WIDE-ANGLE OPTICS (13.3-DEG FIELD OF
VIEW) WILL MEASURE THE TOTAL OUTGOING RADIATION INTEGRATED
OVER THE ENTIRE EARTH DISC. THE SECOND SET OF MEASUREMENTS
WILL COVER EIGHT SPECTRAL INTERVALS AND WILL EMPLOY
HIGH-RESOLUTION SCANNING TECHNIQUES TO MEASURE THE TERRESTRIAL
RADIATION EMANATING FROM RELATIVELY SMALL AREAS OVER A RANGE
OF VARIOUS ZenITH AND AZIMUTH ANGLES. THE INSTRUMENT WILL
CONSIST OF TWO IDENTICAL SCANNING MULTICHANNEL RADIOMETER
HEADS. ONE WILL SCAN FORWARD OF THE SPACECRAFT, AND THE OTHER
WILL SCAN AFT. BOTH HEADS WILL VIEW OPPOSITE HORIZONS AT THE
SAME TIME AND WILL SCAN DOWN TO NADIR TOGETHER. THE SCAN SWEEP
AND RETURN WILL OCCUR IN 64 SEC. EACH HEAD WILL CONTAIN FOUR
SHORTWAVE CHANNELS (0.2 TO 4.0 MICRONS) AND FOUR LONGWAVE
CHANNELS (4.0 TO 50 MICRONS) WITH 0.25- BY 5.14-DEG FIELDS OF
VIEW. THE CHANNELS WILL BE ORIENTED IN A DIRECTIONAL FAN TO
COVER 20 DEG TO EACH SIDE OF THE ORBITAL PLANE. THE 64-SEC
SCAN PERIOD WILL ALLOW AN AREA TO BE MEASURED FROM AS MANY AS
17 DIFFERENT ANGLES AS THE SPACECRAFT PASSES OVERHEAD.

----- NIMBUS-F, STAELIN -----

EXPERIMENT NAME- SCANNING MICROWAVE SPECTROMETER (SCAMS)

NSDDC ID- NIMBUS-F-10

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.H. STAELIN MASS INST OF TECH
CAMBRIDGE, MA
OI - P.T. BARATH NASA-JPL
PASADENA, CA
OI - A.W. BARRETT MASS INST OF TECH
CAMBRIDGE, MA
OI - W.D. LENDIR NASA-JSC
HOUSTON, TX
OI - W. PHILLIPS MASS INST OF TECH
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F SCANNING MICROWAVE SPECTROMETER (SCAMS) IS
DESIGNED TO MAP TROPOSPHERIC TEMPERATURE PROFILES, WATER VAPOR
ABUNDANCE, AND CLOUD WATER CONTENT, AND TO OBTAIN SUCH DATA
FOR WEATHER PREDICTION PURPOSES EVEN IN THE PRESENCE OF
CLOUDS WHICH BLOCK CONVENTIONAL SATELLITE INFRARED SENSORS.
THE SCAMS WILL CONTINUOUSLY MONITOR EMITTED THERMAL RADIATION
AT WAVELENGTHS OF 13.5, 9.5, 5.7, 4.0, AND 0.6 MM. THE THREE
CHANNELS NEAR THE 0.6-MM OXYGEN ABSORPTION BAND WILL BE USED
PRIMARILY TO DEDUCE ATMOSPHERIC TEMPERATURE PROFILES. THE TWO
CHANNELS NEAR 10 MM WILL PERMIT WATER VAPOR AND CLOUD WATER
CONTENT OVER CALM OCEANS TO BE ESTIMATED SEPARATELY. THE
INSTRUMENT, A DICKER-SUPERHETERODYNE TYPE, WILL SCAN PLUS OR
MINUS 45 DEG NORMAL TO THE ORBITAL PLANE WITH A 10-DEG FIELD
OF VIEW. THE THREE OXYGEN CHANNELS WILL SHARE COMMON SIGNAL
AND REFERENCE ANTENNAS. BOTH WATER VAPOR CHANNELS WILL HAVE
THEIR OWN SIGNALS AND REFERENCE ANTENNAS. THE ABSOLUTE RMS
ACCURACY OF THE OXYGEN CHANNELS WILL BE BETTER THAN 2 DEG K
AND THAT OF THE WATER VAPOR CHANNELS BETTER THAN 1 DEG K. THE
DYNAMIC RANGE FOR ALL CHANNELS WILL BE FROM 0 TO 400 DEG K.

----- NIMBUS-F, VONNUN -----

EXPERIMENT NAME- TRACKING AND DATA RELAY

NSDDC ID- NIMBUS-F-13

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.O. VONHUNNASA-GSFC
GREENBELT, MD
OI - L.E. COTFNASA-GSFC
GREENBELT, MD
OI - W.J. MILLERFORDHAM U
NEW YORK, NY
OI - T.R. BUCKLERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL PROVIDE THE NIMBUS PORTION OF A COMMUNICATION LINK FROM NIMBUS TO ATS TO A GROUND STATION. THE PURPOSE OF THE EXPERIMENT WILL BE TO GAIN INFORMATION ON THE USE OF SUCH A LINK FOR RANGE AND RATE COMMUNICATIONS (FOR SATELLITE GEODETIC PURPOSES) AND FOR DATA COMMUNICATION FROM A LOW-ORBITING SPACECRAFT THROUGH A SYNCHRONOUS SPACECRAFT TO A GROUND TELEMETRY STATION. THE INSTRUMENTATION WILL INCLUDE AN S-BAND TRANSPONDER, A COMMAND DETECTOR/DECODER, AN ANTENNA PROGRAMMER, A DIGITAL EVALUATION MODULE, AN S-BAND ANTENNA, AND AN ANTENNA GIMBAL ASSEMBLY.

----- NIMBUS-F, WILHEIT, JR. -----

EXPERIMENT NAME- ELECTRICALLY SCANNING MICROWAVE
RADIOMETER (ESMR)

NSSDC ID- NIMBUS-F-03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.T. WILHEIT, JR.NASA-GSFC
GREENBELT, MD
OI - A.T. EDGERTONAERONET ELECTRONICS
AZUSA, CA

EXPERIMENT BRIEF DESCRIPTION

THE NIMBUS-F ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR) WILL MEASURE THE EARTH'S MICROWAVE EMISSION AT 37 GHZ. THE LIQUID WATER CONTENT OF CLOUDS, THE DISTRIBUTION AND VARIATION OF SEA ICE COVER, AND CROSS CHARACTERISTICS OF LAND SURFACES (VEGETATION, SOIL MOISTURE, AND SNOW COVER) WILL BE OBTAINED FROM THESE MEASUREMENTS. THE DICKE-TYPE RADIOMETER WILL CONSIST OF A SINGLE TIME-SHARING RECEIVER AND AN ELECTRICALLY SCANNING PHASED ARRAY ANTENNA OPERATING AT 0.8 CM (37 GHZ). THE ANTENNA BEAM ARRAY, A 1.0- BY 20- BY 12-CM BOX-LIKE STRUCTURE, WILL BE MOUNTED ON TOP OF THE SPACECRAFT SENSOR RING AND WILL BE POINTED IN THE DIRECTION OF THE SPACECRAFT'S FORWARD MOTION AND TILTED DOWN 40 DEG FROM THE SATELLITE VELOCITY VECTOR. THE ANTENNA BEAM WILL SCAN THE EARTH IN 100 DISCRETE STEPS FOR VARIOUS ANGLES EXTENDING UP TO 35 DEG ON EITHER SIDE OF THE ORBITAL PLANE. THE DEDUCED BRIGHTNESS TEMPERATURES SHOULD BE ACCURATE TO WITHIN 2 DEG K.

***** NIMBUS-G *****

SPACECRAFT COMMON NAME- NIMBUS-G
ALTERNATE NAMES-
NSSDC ID- NIMBUS-G

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 4 OCT 78 SPACECRAFT WEIGHT- 900. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- TA DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEODETIC
ORBIT PERIOD- 108. MIN INCLINATION- 100. DEG
PERIAPSIS- 1100. KM ALT APOAPSIS- 1100. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J. SARGENTNASA-GSFC
GREENBELT, MD
PS - W.R. HANDEENNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE NIMBUS-G RESEARCH AND DEVELOPMENT SATELLITE WILL SERVE AS A STABILIZED, EARTH-ORIENTED PLATFORM FOR THE TESTING OF ADVANCED SYSTEMS FOR SENSING AND COLLECTING METEOROLOGICAL DATA ON A GLOBAL SCALE. THE POLAR-ORBITING SPACECRAFT WILL CONSIST OF THREE MAJOR STRUCTURES -- (1) A HOLLOW TORUS-SHAPED SENSOR MOUNT, (2) SOLAR PADDLES, AND (3) A CONTROL HOUSING UNIT THAT IS CONNECTED TO THE SENSOR MOUNT BY A TRIPOD TRUSS STRUCTURE. CONFIGURED SOMEWHAT LIKE AN OCEAN BUOY, NIMBUS-G WILL BE NEARLY 3.7 M TALL, 1.5 M IN DIAMETER AT THE BASE, AND ABOUT 3 M WIDE WITH SOLAR PADDLES EXTENDED. THE SENSOR MOUNT THAT FORMS THE SATELLITE BASE WILL HOUSE THE ELECTRONICS EQUIPMENT AND BATTERY MODULES. THE LOWER SURFACE OF THE TORUS WILL PROVIDE MOUNTING SPACE FOR SENSORS AND ANTENNAS. A BOX-BEAM STRUCTURE MOUNTED WITHIN THE CENTER OF THE TORUS WILL PROVIDE SUPPORT FOR THE LARGER SENSOR EXPERIMENTS. MOUNTED ON THE CONTROL HOUSING UNIT, WHICH WILL BE LOCATED ON TOP OF THE SPACECRAFT, WILL BE SUN SENSORS, HORIZON SCANNERS, AND A COMMAND ANTENNA. AN ADVANCED ATTITUDE CONTROL SYSTEM WILL PERMIT THE SPACECRAFT'S ORIENTATION TO BE CONTROLLED TO WITHIN

PLUS OR MINUS 1 DEG IN ALL THREE AXES (PITCH, ROLL, AND YAW). NINE EXPERIMENTS HAVE BEEN SELECTED. THEY ARE (1) LACATE - LOWER ATMOSPHERIC COMPOSITION AND TEMPERATURE, (2) SAMS - STRATOSPHERIC AND MESOSPHERIC SOUNDER, (3) CZCS - COASTAL ZONE OCEAN COLOR SCANNER, (4) THIR - TEMPERATURE AND HUMIDITY INFRARED RADIOMETER, (5) MAPS - MEASUREMENT OF AIR POLLUTION FROM SATELLITE, (6) SAM - STRATOSPHERIC AEROSOL MEASUREMENT, (7) ERR - EARTH RADIATION BUDGET, (8) SHMR - SCANNING MULTISPECTRAL MICROWAVE RADIOMETER, AND (9) SOUVTOMS - BACKSCATTER UV/TOTAL OZONE MAPPING SYSTEM. THIS COMPLEMENT OF SENSORS WILL BE CAPABLE OF OBSERVING SEVERAL PARAMETERS OF IMPORTANCE AT AND BELOW THE MESOSPHERIC LEVELS. A NEW CAPABILITY OF IMPORTANCE WILL BE DIRECTED TOWARD OBSERVATION OF ATMOSPHERIC AND OCEAN POLLUTANTS. SUFFICIENT RUNTIME IS PLANNED FOR SEQUENTIAL MAPS (IMAGERY) OF THE PARAMETERS TO BE AVAILABLE FOR STUDY.

----- NIMBUS-G, ALLISON -----

EXPERIMENT NAME- TEMPERATURE/HUMIDITY INFRARED RADIOMETER
(THIR)

NSSDC ID- NIMBUS-G-10

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - L. ALLISONNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE THIR EXPERIMENT OBJECTIVES WILL BE TO MEASURE THE INFRARED RADIATION FROM THE EARTH IN TWO SPECTRAL BANDS DURING BOTH DAY AND NIGHT PORTIONS OF THE ORBIT TO PROVIDE PICTURES OF THE CLOUD COVER, THREE-DIMENSIONAL MAPPINGS OF THE CLOUD COVER, AND TEMPERATURE MAPPINGS OF THE CLOUDS, LAND AND OCEAN SURFACES, CIRRUS CLOUD CONTENT, ATMOSPHERIC CONTAMINATION, AND RELATIVE HUMIDITY. THE NIMBUS-G TEMPERATURE-HUMIDITY INFRARED RADIOMETER (THIR) WILL DETECT EMITTED THERMAL RADIATION IN BOTH THE 10-9- TO 12.5-MICRON REGION (IR WINDOW) AND THE 6.5- TO 7.0-MICRON REGION (WATER VAPOR). THE WINDOW CHANNEL WILL MEASURE CLOUDTOP TEMPERATURES AND WILL BE CAPABLE OF PRODUCING HIGH-RESOLUTION PICTURES OF CLOUDCOVER AND THERMAL GRADIENTS ON LAND AND WATER SURFACES IN CLOUD-FREE AREAS DURING BOTH THE DAY AND NIGHT PORTIONS OF THE ORBIT. THE OTHER CHANNEL WILL OPERATE PRIMARILY AT NIGHT TO MAP THE WATER VAPOR DISTRIBUTION IN THE UPPER TROPOSPHERE AND STRATOSPHERE. SENSOR DATA FROM THESE TWO CHANNELS WILL PRIMARILY BE USED TO SUPPORT OTHER, MORE SOPHISTICATED, METEOROLOGICAL EXPERIMENTS ONBOARD NIMBUS-G. THE INSTRUMENT WILL CONSIST OF A 12.7-CM CASSEGRAIN SYSTEM AND SCANNING MIRROR COMMON TO BOTH CHANNELS, A BEAM SPLITTER, FILTERS, AND TWO GERMANIUM-IMMERSED THERMISTOR BOLOMETERS. IN CONTRAST TO TV, NO IMAGE IS FORMED WITHIN THE RADIOMETER. INCOMING RADIANT ENERGY WILL BE COLLECTED BY A FLAT SCANNING MIRROR INCLINED AT 45 DEG TO THE OPTICAL AXIS. THE MIRROR WILL ROTATE THROUGH 360 DEG AT 48 RPM AND WILL SCAN IN A PLANE NORMAL TO THE SPACECRAFT VELOCITY. THE ENERGY WILL THEN BE FOCUSED IN A DICHOIC BEAM SPLITTER WHICH WILL DIVIDE THE ENERGY SPECTRALLY AND SPATIALLY INTO THE TWO CHANNELS. BOTH CHANNELS OF THIS SENSOR WILL TRANSFORM THE RECEIVED RADIATION INTO ELECTRIC OUTPUT (VOLTAGES), WHICH WILL BE RECORDED ON MAGNETIC TAPE FOR SUBSEQUENT PLAYBACK TO A GROUND ACQUISITION STATION.

----- NIMBUS-G, FRASER -----

EXPERIMENT NAME- STRATOSPHERIC AEROSOL MEASUREMENT-II
(SAM-II)

NSSDC ID- NIMBUS-G-06

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.S. FRASERNASA-GSFC
GREENBELT, MD
OI - M.P. MCCORMICKNASA-LARC
HAMPTON, VA
OI - E. MAULDINNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF SAM II WILL BE TO MAP THE CONCENTRATION AND OPTICAL PROPERTIES OF STRATOSPHERIC AEROSOLS AS A FUNCTION OF ALTITUDE, LATITUDE, AND LONGITUDE. WHEN NO CLOUDS ARE PRESENT IN THE INSTRUMENT FIELD OF VIEW (IFOV), THE TROPOSPHERIC AEROSOLS CAN ALSO BE MAPPED. THE INSTRUMENT, BASICALLY A SUN PHOTOMETER, WILL MEASURE THE EXTINCTION OF SOLAR RADIATION AT THREE WAVELENGTHS AT SPACECRAFT SUNRISE AND SUNSET. THE PHOTOMETER WILL VIEW A PORTION OF THE SOLAR DISK WITH A 0.29-MRAD IFOV WHICH GIVES A VERTICAL RESOLUTION OF 1 KM FOR A 925-KM (500 NANOMETERS) ORBIT. AS THE SPACECRAFT FIRST VIEWS THE SUNRISE, THE PHOTOMETER-POINTING AXIS WILL BE DEPRESSED APPROXIMATELY 0.52 RAD WITH RESPECT TO THE SPACECRAFT HORIZONTAL. THE PHOTOMETER WILL CONTINUE LOOKING AT THE SUN UNTIL ITS DEPRESSON ANGLE IS ON THE ORDER OF 0.44 RAD (APPROXIMATELY 1.4 MIN). BEFORE SUNSET, THE PHOTOMETER HEAD WILL ROTATE 3.14 RAD IN AZIMUTH AND VIEW THE SUN FROM A DEPRESSON OF APPROXIMATELY 0.44 TO 0.52 RAD AS THE SPACECRAFT ORBITS TO THE DARK SIDE OF THE EARTH. FOR THE EXPECTED HIGH NOON ORBIT, LATITUDES OF BETWEEN 1.12 AND 1.40 RAD IN BOTH HEMISPHERES WILL BE SCANNED FOR 3 MO. EACH MRAD LATITUDE WILL

HAVE A 4.985 LONGITUDINAL MEASUREMENT DURING THIS 3-MO PERIOD. THE EXTINCTION MEASUREMENTS WILL BE INVERTED FOR THE NUMBER-DENSITY TIMES THE AEROSOL SCATTERING CROSS SECTION BY USING THE LAMBERT-BEER LAW AND ASSUMING THE ATMOSPHERE TO BE COMPOSED OF LAYERS. TO DETERMINE THE STRATOSPHERIC AEROSOL OPTICAL PROPERTIES, GROUND-TRUTH IN SITU BALLOON-BORNE AEROSOL MEASUREMENTS WILL ALSO BE MADE. EXTINCTION OF SOLAR RADIATION BY THE STRATOSPHERE WILL BE OBSERVED AT 0.35, 0.43, AND 1.0 MICROMETERS.

----- NIMBUS-G, GLOERSEN -----

EXPERIMENT NAME- SCANNING (MULTISPECTRAL) MICROWAVE RADIOMETER (SMNR)

NSSDC ID- NIMBUS-G-08

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P. GLOERSENNASA-GSFC
GREENBELT, MD
OI - J. JOHNSONNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE PRIMARY PURPOSE OF THIS EXPERIMENT WILL BE TO OBTAIN AND USE ATMOSPHERIC MOMENTUM AND ENERGY-TRANSFER PARAMETERS OVER OCEAN AREAS ON A NEARLY ALL-WEATHER OPERATIONAL BASIS. WINDS, WATER VAPOR, LIQUID WATER CONTENT, AND MEAN CLOUD DROPLET SIZE, ALL AT LOW ALTITUDES, ARE PARAMETERS WHICH WILL BE DERIVED. OCEAN ICE VS WATER WILL ALSO BE DETERMINED. MICROWAVE BRIGHTNESS TEMPERATURES BETWEEN 10 AND 300 K WILL BE OBSERVED WITH AN EIGHT-CHANNEL (FOUR FREQUENCY DUAL POLARIZED) DICKE RADIOMETER OPERATING AT 0.0-, 1.4-, 1.7-, AND 2.8-CM WAVELENGTHS. THE ANTENNA WILL BE PARABOLIC REFLECTOR OFFSET FROM NADIR BY 0.73 RAD. MOTION OF THE ANTENNA REFLECTOR WILL PROVIDE OBSERVATIONS FROM WITHIN CONICAL VOLUME OF WHICH THE NADIR IS THE AXIS.

----- NIMBUS-G, HEATH -----

EXPERIMENT NAME- SOLAR AND BACKSCATTER ULTRAVIOLET/TOTAL OZONE MAPPING SYSTEM (SBUV/TOMS)

NSSDC ID- NIMBUS-G-09

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.F. HEATHNASA-GSFC
GREENBELT, MD
OI - R. PREDMORENASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE SBUV/TOMS WILL BE TO SOUND THE VERTICAL DISTRIBUTION OF OZONE, MAP THE TOTAL OZONE AND 200-MD HEIGHT FIELDS, AND MONITOR THE INCIDENT SOLAR ULTRAVIOLET (UV) IRRADIANCE. THE SBUV SPECTROMETER WILL MEASURE SOLAR UV THAT IS BACKSCATTERED BY THE EARTH'S ATMOSPHERE AT 12 WAVELENGTHS BETWEEN 250 AND 340 MICROMETERS WITH A SPECTRAL BAND PASS OF 1 MICROMETER. THE INSTRUMENT FOV OF 0.21 RAD WILL BE DIRECTED AT THE NADIR. A PARALLEL PHOTOMETER CHANNEL AT 380 DEG WILL MEASURE THE REFLECTIVITY OF THE ATMOSPHERE'S LOWER BOUNDARY IN THE SAME 0.21-RAD FOV. BOTH CHANNELS ALSO WILL VIEW THE SUN FOR CALIBRATION THROUGH THE USE OF A DIFFUSER PLATE DEPLOYED NEAR THE TERMINATOR. THE CONTRIBUTION FUNCTIONS FOR THE EIGHT SHORTEST WAVELENGTHS WILL BE CENTERED AT LEVELS RANGING FROM 55 TO 20 KM AND WILL BE USED TO INFER THE VERTICAL OZONE PROFILE. THE FOUR LONGEST WAVELENGTHS HAVE CONTRIBUTION FUNCTIONS IN THE TROPOSPHERE WHICH WILL BE USED TO COMPUTE THE TOTAL OZONE AMOUNT. THE SBUV SPECTROMETER WILL HAVE A SECOND MODE OF OPERATION THAT WILL ALLOW A CONTINUOUS SPECTRAL SCAN FROM 160 TO 400 MICROMETERS FOR DETAILED EXAMINATION OF THE 'ATMOSPHERIC SOLAR SPECTRUM AND THEIR TEMPORAL VARIATIONS. THE TOMS SYSTEMS, OPERATING IN PARALLEL WITH THE SBUV, WILL STEP SCAN PLUS OR MINUS 0.05 RAD NORMAL TO THE ORBITAL TRACK WITH AN FOV OF APPROXIMATELY 0.053 RAD. AT EACH SCAN POSITION THE EARTH RADIANCE WILL BE MONITORED AT FOUR WAVELENGTHS BETWEEN 310 AND 3400 MICROMETERS AND ALSO AT 800 MICROMETERS TO INFER THE TOTAL OZONE AMOUNT. THE INSTRUMENT WILL CONSIST PRINCIPALLY OF THREE EBERT-FASTIE MONOCHROMETERS, TWO OF WHICH ARE OPERATED IN TANDEM FOR STRAY LIGHT REJECTION. TOMS WILL USE THE THIRD MONOCHROMETER, WHICH IS EQUIPPED WITH A SPATIAL SCAN MECHANISM AT THE ENTRANCE SLIT. THE SIGNAL-TO-NOISE RATIO OF THE SBUV WILL BE GREATER THAN 503. THE TOMS SIGNAL-TO-NOISE RATIO WILL BE GREATER THAN 125. IN BOTH UNITS THE ACCURACY WILL BE LIMITED BY THE DIGITAL PRECISION. THREE AUXILIARY MUSE (MONITOR OF UV SOLAR ENERGY)-TYPE SENSORS WILL BE INSTALLED ON AN OUTBOARD SURFACE TO BE ILLUMINATED BY THE SUN NEAR THE TERMINATOR. THE DUV FILTER PHOTOMETER WILL BE SILICON PHOTODIODE. THE TOMS WILL USE A PNT DETECTOR. THE TOMS CLOUD-COVER DETECTOR WILL BE A SILICON PHOTODIODE. THERE WILL BE THREE VACUUM PHOTODIODES IN MUSE.

----- NIMBUS-G, HOUGHTON -----

EXPERIMENT NAME- STRATOSPHERIC AND MESOSPHERIC SOUNDER (SAMS)

NSSDC ID- NIMBUS-G-02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.T. HOUGHTONOXFORD U
OXFORD, ENGLAND
OI - W.L. BARNESNASA-GSFC
GREENBELT, MD
OI - K. DAVIESNOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF SAMS WILL BE TO OBSERVE EMISSION FROM THE LIMB OF THE ATMOSPHERE THROUGH VARIOUS PRESSURE MODULATOR RADIOMETERS AND TO DETERMINE TEMPERATURE AND H_2O , N_2O , CH_4 , CO , NO_2 , NO , AND O_3 COMPOSITION IN THE STRATOSPHERE AND MESOSPHERE (10 TO 120 KM). MEASUREMENTS OF ZONAL WIND IN THE 50- TO 120-KM REGION WILL ALSO BE ATTEMPTED FROM OBSERVATIONS OF THE DOPPLER SHIFT ATMOSPHERIC EMISSION LINES. RADIATION FROM THE LIMB OF THE ATMOSPHERE WILL BE INCIDENT ON A TELESCOPE OF 15-CM APERTURE. IN FRONT OF THE TELESCOPE A PLANE MIRROR WILL SCAN THE LIMB, VIEW SPACE FOR CALIBRATION, AND VIEW AT A SLANT ANGLE INTO THE ATMOSPHERE FOR VERTICAL-TYPE SOUNDING. FOUR ADJACENT FIELDS OF VIEW, EACH 20 BY 2.8 MRAD (CORRESPONDING TO 100 KM AT THE LIMB), WILL FOCUS ONTO A FIELD-SPLITTING MIRROR WHICH DIRECTS RADIATION TO NINE DETECTORS. THE REMAINING DIVISION INTO CHANNELS WILL BE ACCOMPLISHED THROUGH DICHRIC BEAM SPLITTERS. OF EIGHT PRESSURE MODULATOR CELLS (PMC) TWO WILL CONTAIN CO_2 , THE REMAINDER NO_2 , NO , CH_4 , N_2O , CO , NO , H_2O . PRESSURE IN THE CELLS MAY BE VARIED ON COMMAND BY CHANGING THE TEMPERATURE OF A SMALL CONTAINER OF MOLECULAR SIEVE MATERIAL ATTACHED TO EACH PMC. A SINGLE FILTER CHANNEL TUNING ZONE AT 9.5 MICROMETERS WILL ALSO BE INCLUDED. IN ADDITION TO AN H_2O CHANNEL EXTENDING FROM 25 TO 70 MICROMETERS, NINE CHANNELS LIE WITHIN THE RANGE 4.3 TO 15 MICROMETERS. WITHIN THE TELESCOPE, A CHOPPER OPERATING AT 300 HZ WILL ALLOW MEASUREMENT OF TWO SEPARATE SIGNALS FROM ALL DETECTORS BUT THE OZONE. ONE AT 300 HZ AND ONE AT THE PMC FREQUENCY. COMPARISON OF THESE SIGNALS WILL PERMIT ELIMINATING EMISSION FROM INTERFERING GASES WITHIN A PARTICULAR SPECTRAL INTERVAL. IN FRONT OF THE CHOPPER A SMALL BLACK BODY AT KNOWN TEMPERATURE CAN BE INTRODUCED FOR CALIBRATION. ACCURATE MEASUREMENT OF THE ATMOSPHERIC PRESSURE AT THE LEVEL BEING VIEWED WILL BE OBTAINED FROM THE TWO SIGNALS FROM ONE CO_2 CHANNEL.

----- NIMBUS-G, HOVIS -----

EXPERIMENT NAME- COASTAL ZONE OCEAN COLOR SCANNER

NSSDC ID- NIMBUS-G-03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.A. HOVISNASA-GSFC
GREENBELT, MD
OI - H.L. PICHARDNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE COASTAL ZONE COLOR SCANNER EXPERIMENT IS DESIGNED TO MAP CHLOROPHYLL CONCENTRATIONS IN WATER, SEDIMENT DISTRIBUTION, GELBSTOFFE CONCENTRATIONS AS A SALINITY INDICATOR, AND TEMPERATURE OF COASTAL WATERS AND OCEAN CURRENTS. REFLECTED SOLAR ENERGY WILL BE MEASURED IN FIVE CHANNELS TO SENSE COLOR CAUSED BY ABSORPTIONS DUE TO CHLOROPHYLL, SEDIMENTS, AND GELBSTOFFE IN COASTAL WATERS. SPECTRAL BANDS AT 443 AND 670 NANOMETERS WILL CENTER ON THE MOST INTENSE ABSORPTION RIMOS OF CHLOROPHYLL, WHILE THE BAND AT 550 NANOMETERS WILL CENTER ON THE 'HINGE POINT,' THE WAVELENGTH OF MINIMUM ABSORPTION. RATIOS OF MEASURED ENERGIES IN THESE CHANNELS HAVE BEEN SHOWN TO CLOSELY PARALLEL SURFACE CHLOROPHYLL CONCENTRATIONS. DATA FROM THE SCANNING RADIOMETER WILL BE PROCESSED, WITH ALGORITHMS DEVELOPED FROM THE FIELD EXPERIMENT DATA, TO PRODUCE MAPS OF CHLOROPHYLL ABSORPTION. THE TEMPERATURE OF COASTAL WATERS AND OCEAN CURRENTS WILL BE MEASURED IN A SPECTRAL BAND CENTERED AT 11.5 MICROMETERS. TO AVOID SUN GLINT, THE SCANNER MIRROR CAN BE TILTED ABOUT THE OBSERVATORY PITCH AXIS ON COMMAND SO THAT THE LINE OF SIGHT OF THE SENSOR IS MOVED PLUS OR MINUS 0.35 RAD IN STEPS OF 0.035 RAD WITH RESPECT TO NADIR.

----- NIMBUS-G, JACOBOWITZ -----

EXPERIMENT NAME- EARTH RADIATION BUDGET (ERB)

NSSDC ID- NIMBUS-G-07

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H. JACOBOWITZNOAA-NESS
SUTLAND, MD
OI - T. ANDERSONNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THE EARTH RADIATION BUDGET (ERB) EXPERIMENT, A CONTINUATION OF NIMBUS-G ERB, WILL BE TO DETERMINE, OVER A PERIOD OF A YEAR, THE FLOW IN BOTH SYNOPSIS AND PLANETARY SCALES BY SIMULTANEOUS MEASUREMENT OF INCOMING

SUN RADIATION (0.2 TO 1.0 MICROMETERS) AND OUTGOING EARTH-REFLECTED (SHORTWAVE) AND EMITTED (LONGWAVE) RADIATION (0.2 TO 40 MICROMETERS). BOTH FIXED WIDE ANGLE SAMPLING OF TERRRESTRIAL FLUXES AT THE SATELLITE ALTITUDE AND SCANNED NARROW ANGLE SAMPLING OF THE RADIANCE COMPONENTS DEPENDENT ON ANGLE WILL BE USED TO DETERMINE OUTGOING RADIATION (REFLECTED AND EMITTED). THE FDS SUBSYSTEM WILL BE A 22-CHANNEL RADIOMETER CONTAINING SEPARATE SUBASSEMBLIES TO PERFORM THE REQUIRED SOLAR, EARTH-FLUX (WIDE ANGLE), AND SCANNED EARTH RADIANCE (NARROW ANGLE) MEASUREMENTS. THE SYSTEMS WILL USE OPTICAL FILTERS FOR SPECTRAL DISCRIMINATIONS, AS WELL AS UNCOOLED THERMAL DETECTORS, THERMOPILE DETECTORS IN THE SOLAR AND FIXED-EARTH-FLUX CHANNELS, AND PYROELECTRIC DETECTORS IN THE SCANNING CHANNELS. THE 10 SOLAR CHANNELS WILL VIEW IN FRONT OF THE OBSERVATORY DATA ONLY DURING A PERIOD OF ABOUT 3 MIN IN EACH ORBIT WHEN THE SPACECRAFT IS OVER THE ANTARCTIC REGION. THEIR FULL RESPONSE FIELD OF VIEW (FOVS) WILL BE 0.18 RAD. THE SOLAR CHANNEL SUBASSEMBLY CAN BE PIVOTED PLUS OR MINUS 0.35 RAD IN THE XY PLANE TO COMPENSATE FOR SUN ANGLE DEVIATION IF REQUIRED. THE EARTH-FLUX CHANNELS WILL BE MOUNTED SO THEY CAN CONTINUOUSLY VIEW THE TOTAL EARTH DISK AND WILL BE CONTINUOUSLY SAMPLED AT FOUR PER SEC. DEMODULATOR OUTPUT SIGNALS WILL BE INTEGRATED FOR PERIODS OF AT LEAST 3/8 SEC. THERE WILL BE EIGHT NARROW FDS CHANNELS (FOUR SHORTWAVE AND FOUR LONGWAVE) MOUNTED IN THE SCANNING HEAD. THE HEAD AND WILL BE GYNAUMOUNTED IN THE RADIOMETER UNIT MAIN FRAME. THE FOVS OF THE TELESCOPES ARE ASYMMETRIC (4.4 BY 09.4 MRAD) AND THE FOVS OF THE SHORTWAVE AND LONGWAVE CHANNELS ARE COINCIDENT. THE 09.4 MRAD FOVS OF THE FOUR PAIR OF CHANNELS ARE NOT CONTIGUOUS. BUT WILL COVER ONLY ALTERNATE 09.4 MRAD ANGULAR INTERVALS ALONG THE HORIZON.

----- NIMBUS-G, REICHEL, JR. -----
 EXPERIMENT NAME- MEASUREMENT OF AIR POLLUTION FROM SATELLITE (MAPS)

NSSDC ID- NIMBUS-G-05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.G. REICHEL, JR.NASA-LARC
 HAMPTON, VA
 DI - D. HESKETHNASA-LARC
 HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION
 MAPS WILL CHART THE GLOBAL DISTRIBUTIONS OF CO, CH(4), SO(2), AND NH(3) TO ESTABLISH GLOBAL BACKGROUND VALUES, DETERMINE AIR QUALITY ON REGIONAL SCALES, TRACK MOVEMENT OF CONTAMINATED AIR MASSES, AND STUDY DISPERSAL AND SCAVENGING MECHANISMS. THE INSTRUMENT WILL BE A MULTIPLE CHANNEL, NADIR-VIEWING RADIOMETER, EMPLOYING GAS FILTER CORRELATION AND THERMAL BRIGHTNESS SECTIONS. THE CHANNELS FOR THE GASES TO BE MEASURED WILL OPERATE IN THE INFRARED REGION OF THE SPECTRUM. SAMPLES OF EACH GAS, TO BE USED AS OPTICAL FILTERS, WILL BE CONTAINED IN QUARTZ CELLS AT TWO DIFFERENT PARTIAL PRESSURES. A CHOPPER WILL ALLOW ALTERNATE VIEWING OF EARTH RADIANCE THROUGH A GAS-FILLED CELL AND AN IDENTICAL EVACUATED CELL. RADIANCE-DIFFERENCE READINGS BETWEEN FILTERED AND UNFILTERED OPTICAL PATHS WILL BE BALANCED INTERNALLY WHEN A KNOWN RADIANCE SOURCE IS VIEWED. WHILE SUCH READINGS OF THE EARTH WILL BE RELATED TO ATMOSPHERIC CONSTITUENTS, INTERNAL WARM AND COLD SOURCES AND AN IMBALANCE TARGET WILL BE PERIODICALLY INJECTED INTO THE FIELD OF VIEW FOR INSTRUMENT CALIBRATION. RADIATION FROM THE EARTH WILL BE SPECTRALLY FILTERED TO ADMIT TO THE DETECTORS ONLY A NARROW ABSORPTION BAND RELATED TO A GIVEN SPECIES OF GAS. A FULL RADIOMETRIC MODULE WILL BE DEVOTED TO EACH GAS. EACH SPECTRAL BAND PASS WILL BE CENTERED AROUND THE FOLLOWING VALUES IN MICROMETERS CO(4.6), CH(4) (8.0), SO(2)(8.55), AND NH(3) (11.2). GAS FILTER CORRELATION TECHNIQUES APPLIED TO THE INSTRUMENT OUTPUTS WILL IMPLY THE AMOUNT OF A GAS SPECIES IN THE ATMOSPHERE. SIMULTANEOUS KNOWLEDGE OF ATMOSPHERIC AMBIENT CONDITION (SUCH AS TEMPERATURE DISTRIBUTION, AMOUNT OF WATER VAPOR, CLOUD COVER, AND SUN ANGLE), OBTAINED FROM OTHER INSTRUMENTS, WILL BE NECESSARY TO THE DATA ANALYSIS.

----- NIMBUS-G, RUSSELL, JR. -----
 EXPERIMENT NAME- LOWER ATMOSPHERIC COMPOSITION AND TEMPERATURE EXPERIMENT (LACATE)

NSSDC ID- NIMBUS-G-01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.W. RUSSELL, JR.NASA-LARC
 HAMPTON, VA
 DI - A. JALINKNASA-LARC
 HAMPTON, VA
 DI - W.A. HADVISNASA-GSFC
 GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
 THE OBJECTIVE OF LACATE WILL BE TO MAP THE VERTICAL PROFILES OF TEMPERATURE AND THE CONCENTRATIONS OF O(3), H(2)O, NO(2), N(2)O, HNO(3), CH(4), AND AEROSOLS IN THE UPPER ATMOSPHERE TO MIDDLE STRATOSPHERE RANGE, WITH EXTENSION TO

THE STRATOPAUSE FOR WATER VAPOR AND INTO THE LOWER MESOSPHERE FOR TEMPERATURE AND OZONE. THE INSTRUMENT WILL BE A 10-CHANNEL INFRARED (IR) RADIOMETER THAT INCORPORATES HG-CD-TE DETECTORS COOLED TO 80 DEG K, USING A TWO-STAGE SOLID CRYOGEN COOLER. ALTITUDE PROFILES OF RADIANCE EMITTED BY THE EARTH'S HORIZON (WHICH ARE OBSERVED) WILL LIE BETWEEN 0.2 AND 17.2 MICROMETERS. THE INSTRUMENT FIELD OF VIEW AT THE HORIZON WILL BE 1.8 KM FOR THE CO(2) AND O(3) CHANNELS, 2 KM FOR THE HNO(3) AND AEROSOL CHANNELS, AND 4 KM FOR THE NO(2), CH(4), H(2)O, AND N(2)O CHANNELS. THE INSTRUMENT WILL INCORPORATE TWO DRIVE MOTORS FOR OBTAINING HORIZON ELEVATION AND AZIMUTH SCANS. AZIMUTH SCANNING WILL ALLOW MEASUREMENT OF VERTICAL PROFILES OF RADIANCE ON AND OFF ORBIT TRACK. THIS WILL PROVIDE DATA FOR USE IN STUDIES OF THE STRATOSPHERIC DYNAMICS AND THE DIURNAL CYCLES OF TEMPERATURE AND CONSTITUENTS. THE RADIOMETER WILL MAP VERTICAL PROFILES OF THERMAL INFRARED EMISSION COMING FROM THE HORIZON IN NINE BANDS OF TRACE CONSTITUENTS IN THE ATMOSPHERE. THREE CHANNELS WILL BE INCLUDED TO DETERMINE RADIANCE PROFILES OF EMISSION BY CO(2) IN TWO SPECTRAL BANDS. THESE PROFILES WILL BE MATHEMATICALLY INVERTED TO OBTAIN TEMPERATURE VS PRESSURE. THE TEMPERATURE PROFILE, TOGETHER WITH RADIANCE PROFILES IN THE OTHER SPECTRAL BANDS WILL THEN BE USED TO DETERMINE THE VERTICAL DISTRIBUTIONS OF TRACE CONSTITUENTS. TEMPERATURE MAY BE DETERMINED TO AN ACCURACY OF ABOUT 1.5 DEG K, AND CONSTITUENT CONCENTRATIONS MAY BE MEASURED WITH AN ACCURACY OF ABOUT 15 PERCENT OR LESS.

***** NOAA 2 *****

SPACECRAFT COMMON NAME- NOAA 2
 ALTERNATE NAMES- PL-701J, ITOS-D
 96235
 NSSDC ID- 72-082A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
 AT ZERO DATA ACQUISITION RATE SINCE 10/16/74.

LAUNCH DATE- 10/15/72 SPACECRAFT WEIGHT- 306. KG
 LAUNCH SITE- VANDENBERG AFB, UNITED STATES
 LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
 UNITED STATES NOAA-NESF
 UNITED STATES NASA-DA

INITIAL ORBIT PARAMETERS
 ORBIT TYPE- GEOCENTRIC EPOCH DATE- 10/15/72
 ORBIT PERIOD- 114.9 MIN INCLINATION- 101.760 DEG
 PERIAPSIS- 1440.18 KM ALT APOAPSIS- 1453.97 KM ALT

RECENT ORBIT PARAMETERS
 ORBIT TYPE- GEOCENTRIC EPOCH DATE- 09/07/73
 ORBIT PERIOD- 114.90 MIN INCLINATION- 101.722 DEG
 PERIAPSIS- 1448.37 KM ALT APOAPSIS- 1453.73 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PM - S. WEILANDNASA-GSFC
 GREENBELT, MD
 PS - L.L. GOLDBERGNASA-GSFC
 GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
 NOAA 2 WAS THE FIRST IN A SERIES OF RECONFIGURED ITOS-M SATELLITES LAUNCHED WITH NEW METEOROLOGICAL SENSORS ON BOARD TO EXPAND THE OPERATIONAL CAPABILITY OF THE ITOS SYSTEM. NOAA 2 WAS NOT EQUIPPED WITH CONVENTIONAL TV CAMERAS. IT WAS THE FIRST OPERATIONAL WEATHER SATELLITE TO RELY SOLELY UPON RADIOMETRIC IMAGING TO OBTAIN CLOUDCOVER DATA. THE PRIMARY OBJECTIVE OF NOAA 2 WAS TO PROVIDE GLOBAL DAYTIME AND NIGHT-TIME DIRECT READOUT REAL-TIME CLOUDCOVER DATA ON A DAILY BASIS. THE SUN-SYNCHRONOUS SPACECRAFT WAS ALSO CAPABLE OF SUPPLYING GLOBAL ATMOSPHERIC TEMPERATURE SOUNDINGS AND VERY HIGH RESOLUTION INFRARED CLOUDCOVER DATA FOR SELECTED AREAS IN EITHER A DIRECT READOUT OR A TAPE-RECORDER MODE. A SECONDARY OBJECTIVE WAS TO OBTAIN GLOBAL SOLAR-PROTON FLUX DATA ON A REAL-TIME DAILY BASIS. THE PRIMARY SENSORS CONSISTED OF A VERY HIGH RESOLUTION RADIOMETER (VHRR), A VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR), AND A SCANNING RADIOMETER (SR). THE VHRR, VTPR, AND SR WERE MOUNTED ON THE SATELLITE BASEPLATE WITH THEIR OPTICAL AXES DIRECTED VERTICALLY EARTHWARD. THE NEARLY CUBICAL SPACECRAFT MEASURED 1 BY 1 BY 1.2 M. THE SATELLITE WAS EQUIPPED WITH THREE CURVED SOLAR PANELS THAT WERE FOLDED DURING LAUNCH AND DEPLOYED AFTER ORBIT WAS ACHIEVED. EACH PANEL MEASURED OVER 4.2 M IN LENGTH AND UNFOLDED AND WAS COVERED WITH 3420 SOLAR CELLS MEASURING 2 BY 2 CM. THE NOAA 2 DYNAMICS AND ALTITUDE CONTROL SYSTEM MAINTAINED DESIRED SPACECRAFT ORIENTATION THROUGH GYROSCOPIC PRINCIPLES INCORPORATED INTO THE SATELLITE DESIGN. EARTH ORIENTATION OF THE SATELLITE BODY WAS MAINTAINED BY TAKING ADVANTAGE OF THE PRECESSION INDUCED FROM A MOMENTUM FLYWHEEL SO THAT THE SATELLITE BODY PRECESSION RATE OF ONE REVOLUTION PER ORBIT PROVIDED THE DESIRED EARTH-LOOKING ATTITUDE. MINOR ADJUSTMENTS IN ATTITUDE AND ORIENTATION WERE MADE BY MEANS OF MAGNETIC COILS AND BY VARYING THE SPEED OF THE MOMENTUM FLYWHEEL. THE SPACECRAFT OPERATED SATISFACTORILY UNTIL MARCH 18, 1974, WHEN VTPR FAILED. NOAA 2 WAS THEN PLACED IN A MARGINAL STANDBY MODE FROM MARCH 19 TO JULY 1974. IT WAS THEN USED AS THE OPERATIONAL NOAA SATELLITE DUE TO NOAA 3 VTPR FAILURE, AND THE SUCCESSFUL RESTART OF THE VTPR EXPERIMENT ON THIS SPACECRAFT BEGAN ON JUNE 13, 1974.

----- NOAA 2, BOSTROM -----

EXPERIMENT NAME- SOLAR PROTON MONITOR

NSSDC ID- 72-082A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/01/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.O. BOSTROMAPPLIED PHYSICS LAB
SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THREE SOLID STATE DETECTORS MONITORED THE
ONNIDIRECTIONAL FLUXES OF SOLAR PROTONS WITH ENERGIES ABOVE
10, 30, AND 60 MEV, RESPECTIVELY. TWO TELESCOPES CONSISTING OF
SOLID STATE DETECTORS EACH MEASURED DIRECTIONAL FLUXES OF
PROTONS BETWEEN 0.27 MEV AND 3.2 MEV (IN THREE INTERVALS),
PROTONS BETWEEN 3.2 AND 60 MEV, PROTONS ABOVE 60 MEV, AND
ALPHA PARTICLES BETWEEN 12.5 AND 32 MEV. IN THE POLAR CAP
REGION, WHICH IS OF THE GREATEST INTEREST, THE TELESCOPES
VIEWED PARALLEL AND PERPENDICULAR TO THE LOCAL MAGNETIC FIELD
DIRECTION. AN ADDITIONAL SOLID STATE DETECTOR MEASURED
DIRECTIONAL FLUXES OF ELECTRONS OF ENERGIES GREATER THAN 140
KEV. THIS DETECTOR LOOKED IN A DIRECTION PERPENDICULAR TO THE
ORBIT PLANE.

----- NOAA 2, NESS STAFF -----

EXPERIMENT NAME- SCANNING RADIOMETER (SR)

NSSDC ID- 72-082A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT ZERO DATA ACQUISITION RATE SINCE 10/16/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - NESS STAFFNOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE NOAA 2 SCANNING RADIOMETER (SR) SUBSYSTEM CONSISTED
OF TWO SCANNING RADIOMETERS, A DUAL SR PROCESSOR, AND TWO SR
RECORDERS. THIS SUBSYSTEM PERMITTED THE DETERMINATION OF
SURFACE TEMPERATURES OF THE GROUND, THE SEA, JR CLOUD TOPS
VIEWED BY THE RADIOMETER. THE RADIOMETER MEASURED REFLECTED
RADIATION FROM THE EARTH ATMOSPHERE SYSTEM IN THE 0.52- TO
0.73-MICRON BAND DURING THE DAY AND EMITTED RADIATION FROM THE
EARTH AND ITS ATMOSPHERE IN THE 10.5- TO 12.5-MICRON BAND
DURING THE DAY AND NIGHT. UNLIKE A CAMERA, THE SR DID NOT TAKE
A PICTURE BUT INSTEAD FORMED AN IMAGE USING A CONTINUOUSLY
ROTATING MIRROR. THE MIRROR SCANNED THE EARTH'S SURFACE
PERPENDICULAR TO THE SATELLITE'S ORBITAL PATH AT A RATE OF 48
RPM. AS THE SATELLITE PROGRESSED ALONG ITS ORBITAL PATH, EACH
ROTATION OF THE MIRROR PROVIDED ONE SCAN LINE OF PICTURE-
RADIATION COLLECTED BY THE MIRROR WAS PASSED THROUGH A BEAM
SPLITTER AND SPECTRAL FILTER TO PRODUCE THE DESIRED SPECTRAL
SEPARATION. UP TO TWO FULL ORBITS OF DATA (145 MIN) COULD BE
STORED ON MAGNETIC TAPE FOR SUBSEQUENT TRANSMISSION (1697.5
MHZ) TO AN ACQUISITION STATION. THE DATA COULD BE TRANSMITTED
IN REAL TIME TO LOCAL APT STATIONS. ONCE THE SIGNAL WAS
RECEIVED BY THE GROUND STATION, A CONTINUOUS PICTURE WAS
FORMED BY USING A FACSIMILE RECORDER WHOSE SCAN WAS IN PHASE
WITH THE SATELLITE'S FORWARD MOTION. AT A NOMINAL SPACECRAFT
ALTITUDE OF 1460 KM, THE RADIOMETER HAD A GROUND RESOLUTION OF
BETTER THAN 4 KM AT NADIR. THE RADIOMETER WAS CAPABLE OF
YIELDING RADIANCE TEMPERATURES BETWEEN 105 AND 330 DEG K TO AN
ACCURACY OF 4 AND 1 DEG K, RESPECTIVELY. DATA FROM THIS
EXPERIMENT ARE PRESENTLY MAINTAINED AT NOAA-NESS, SUITLAND,
MD. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-E, -F, AND -G.
DATA FROM THIS EXPERIMENT ARE INDEXED IN DATA SET 72-082A-02A.

***** NOAA 3 *****

SPACECRAFT COMMON NAME- NOAA 3

ALTERNATE NAMES- ITOS-F, 692D

NSSDC ID- 73-086A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/16/74.

LAUNCH DATE- 11/06/73 SPACECRAFT WEIGHT- 746. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NOAA-NESS
UNITED STATES NASA-DA

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 11/07/73
ORBIT PERIOD- 116.09 MIN INCLINATION- 102.077 DEG
PERIAPSIS- 1499.99 KM ALT APOAPSIS- 1509.23 KM ALT

RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 06/25/74
ORBIT PERIOD- 116.00 MIN INCLINATION- 102.037 DEG
PERIAPSIS- 1500.03 KM ALT APOAPSIS- 1509.25 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - S. WEILANDNASA-GSFC
GREENBELT, MD

PS - L.L. GOLDBERGNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE NOAA 3 (ITOS-F) WAS ONE IN A SERIES OF IMPROVED
ITOS-H TYPE SATELLITES THAT WAS LAUNCHED WITH NEW
METEOROLOGICAL SENSORS ON BOARD TO EXPAND THE OPERATIONAL
CAPABILITY OF THE ITOS SYSTEM. THE PRIMARY OBJECTIVE OF THE
ITOS-F METEOROLOGICAL SATELLITE WAS TO PROVIDE GLOBAL DAYTIME
AND NIGHTTIME DIRECT READOUT CLOUDCOVER DATA ON A DAILY BASIS.
THE SUN-SYNCHRONOUS SPACECRAFT WAS ALSO CAPABLE OF SUPPLYING
GLOBAL ATMOSPHERIC TEMPERATURE SOUNDINGS AND VERY HIGH
RESOLUTION INFRARED CLOUDCOVER DATA OF SELECTED AREAS IN
EITHER A DIRECT READOUT OR A TAPE RECORDED MODE. A SECONDARY
OBJECTIVE WAS TO OBTAIN GLOBAL SOLAR PROTON FLUX DATA ON A
ROUTINE DAILY BASIS. THE PRIMARY SENSORS CONSISTED OF A VERY
HIGH RESOLUTION RADIOMETER (VHRR), A VERTICAL TEMPERATURE
PROFILE RADIOMETER (VTPR), AND A SCANNING RADIOMETER (SR).
THE VHRR, VTPR, AND SR WERE MOUNTED ON THE SATELLITE BASEPLATE
WITH THEIR OPTICAL AXES DIRECTED VERTICALLY EARTHWARD. THE
NEARLY CUBICAL SPACECRAFT MEASURED 1 BY 1 BY 1.2 M. THE
SATELLITE WAS EQUIPPED WITH THREE CURVED SOLAR PANELS THAT
WERE FOLDED DURING LAUNCH AND DEPLOYED AFTER ORBIT WAS
ACHIEVED. EACH PANEL MEASURED OVER 4.2 M IN LENGTH WHEN
UNFOLDED AND WAS COVERED WITH 3420 SOLAR CELLS MEASURING 2 BY
2 CM. THE ITOS DYNAMICS AND ATTITUDE CONTROL SYSTEM
MAINTAINED DESIRED SPACECRAFT ORIENTATION THROUGH GYROSCOPIC
PRINCIPLES INCORPORATED INTO THE SATELLITE DESIGN. EARTH
ORIENTATION OF THE SATELLITE BODY WAS MAINTAINED BY TAKING
ADVANTAGE OF THE PRECESSION INDUCED FROM A MOMENTUM FLYWHEEL
SO THAT THE SATELLITE BODY PRECESSION RATE OF ONE REVOLUTION
PER ORBIT PROVIDED THE DESIRED "EARTH LOOKING" ATTITUDE.
MINOR ADJUSTMENTS IN ATTITUDE AND ORIENTATION WERE MADE BY
MEANS OF MAGNETIC COILS AND BY VARYING THE SPEED OF THE
MOMENTUM FLYWHEEL. THE SPACECRAFT OPERATED SATISFACTORILY
UNTIL JUNE 7, 1974, WHEN THE REMAINING VTPR SENSOR WENT OUT OF
CALIBRATION. UNCALIBRATED DATA HAVE BEEN OBTAINED SINCE THAT
TIME. THIS SPACECRAFT WAS REPLACED BY NOAA 2 AS THE ACTIVE
OPERATIONAL SATELLITE ON JULY 1, 1974.

----- NOAA 3, BOSTROM -----

EXPERIMENT NAME- SOLAR PROTON MONITOR

NSSDC ID- 73-086A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT ZERO DATA ACQUISITION RATE SINCE 07/01/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.O. BOSTROMAPPLIED PHYSICS LAB
SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THREE SOLID-STATE DETECTORS MONITORED THE
ONNIDIRECTIONAL FLUXES OF SOLAR PROTONS WITH ENERGIES ABOVE
10, 30, AND 60 MEV, RESPECTIVELY. TWO TELESCOPES CONSISTING
OF SOLID-STATE DETECTORS EACH MEASURED DIRECTIONAL FLUXES OF
PROTONS BETWEEN 0.27 MEV AND 3.2 MEV (IN THREE INTERVALS),
PROTONS BETWEEN 3.2 AND 60 MEV, PROTONS ABOVE 60 MEV, AND
ALPHA PARTICLES BETWEEN 12.5 AND 32 MEV. IN THE POLAR CAP
REGION WHICH IS OF THE GREATEST INTEREST, THE TELESCOPES
VIEWED PARALLEL TO, AND PERPENDICULAR TO, THE LOCAL MAGNETIC
FIELD DIRECTION. AN ADDITIONAL SOLID-STATE DETECTOR MEASURED
DIRECTIONAL FLUXES OF ELECTRONS OF ENERGIES GREATER THAN 140
KEV. THIS DETECTOR LOOKED IN A DIRECTION PERPENDICULAR TO THE
ORBIT PLANE.

----- NOAA 3, NESS STAFF -----

EXPERIMENT NAME- SCANNING RADIOMETER (SR)

NSSDC ID- 73-086A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/16/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - NESS STAFFNOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE NOAA 3 (ITOS-F) SCANNING RADIOMETER (SR) SUBSYSTEM
CONSISTED OF TWO SCANNING RADIOMETERS, A DUAL SR PROCESSOR,
AND TWO SR RECORDERS. THIS SUBSYSTEM PERMITTED THE
DETERMINATION OF SURFACE TEMPERATURES OF THE GROUND, THE SEA,
OR CLOUD TOPS VIEWED BY THE RADIOMETER. THE RADIOMETER
MEASURED REFLECTED RADIATION FROM THE EARTH/ATMOSPHERE SYSTEM
IN THE 0.52- TO 0.73-MICRON CHANNEL DURING THE DAY AND EMITTED
RADIATION FROM THE EARTH AND ITS ATMOSPHERE IN THE 10.5- TO
12.5-MICRON CHANNEL DURING THE DAY AND NIGHT. UNLIKE A
CAMERA, THE SR DID NOT TAKE A PICTURE BUT INSTEAD FORMED AN
IMAGE USING A CONTINUOUSLY ROTATING MIRROR. THE MIRROR
SCANNED THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S
ORBITAL PATH AT A RATE OF 48 RPM. AS THE SATELLITE PROGRESSED
ALONG ITS ORBITAL PATH, EACH ROTATION OF THE MIRROR PROVIDED
ONE SCAN LINE OF PICTURE. RADIATION COLLECTED BY THE MIRROR
PASSED THROUGH A BEAM SPLITTER AND SPECTRAL FILTER TO PRODUCE
THE DESIRED SPECTRAL SEPARATION. UP TO TWO FULL ORBITS OF
DATA (145 MIN) WERE STORED ON MAGNETIC TAPE FOR SUBSEQUENT
TRANSMISSION (1697.5 MHZ) TO AN ACQUISITION STATION. THE DATA
WERE ALSO TRANSMITTED IN REAL TIME TO LOCAL APT STATIONS.
ONCE THE SIGNAL WAS RECEIVED BY THE GROUND STATION, A
CONTINUOUS PICTURE WAS FORMED BY USING A FACSIMILE RECORDER
WHOSE SCAN WAS IN PHASE WITH THE SATELLITE'S FORWARD MOTION.
FROM A PLANNED ALTITUDE OF 1460 KM, THE RADIOMETER HAD A
GROUND RESOLUTION OF APPROXIMATELY 4 KM AT NADIR AND WAS

CAPABLE OF YIELDING RADIANCE TEMPERATURES BETWEEN 185 AND 330 DEG K TO AN ACCURACY OF +8 AND -1 DEG K, RESPECTIVELY. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WAS HANDLED BY NOAA AND WILL EVENTUALLY BE ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NC. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-D, -E, AND -F.

----- NOAA 3, NESS STAFF -----

EXPERIMENT NAME- VERY HIGH RESOLUTION RADIOMETER (VHRR)

NESSDC ID- 73-006A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 10/16/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFFNOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE NOAA 3 (ITOS-F) VERY HIGH RESOLUTION RADIOMETER (VHRR) EXPERIMENT WAS DESIGNED TO CONTINUOUSLY MEASURE SURFACE TEMPERATURES OF THE EARTH, SEA, AND CLOUD TOPS IN DAYLIGHT AS WELL AS AT NIGHT AND TO TRANSMIT THE TEMPERATURE DATA IN REAL TIME TO COMMAND AND DATA ACQUISITION (CDA) STATIONS THROUGHOUT THE WORLD FOR USE IN LOCAL WEATHER FORECASTING. THE SPACECRAFT WAS PROGRAMMED TO RECORD UP TO 9 MIN OF DATA FOR REMOTE AREAS WHERE NO CDA STATION WAS WITHIN RANGE OF THE SPACECRAFT, WITH THE RECORDED DATA PLAYED BACK TO THE NEXT CDA STATION THAT THE SPACECRAFT PASSED. THE EXPERIMENT INCLUDED TWO SCANNING RADIOMETERS, A MAGNETIC TAPE RECORDER, AND ASSOCIATED ELECTRONICS. THE TWO-CHANNEL VHRR OPERATED SIMILARLY TO THE SCANNING RADIOMETER (SR) BUT WITH MUCH GREATER RESOLUTION (0.9 KM COMPARED TO 4 KM FOR THE SR AT NAUGHT). THE INFRARED CHANNEL MEASURED REFLECTED VISUAL RADIATION FROM CLOUD TOPS IN THE LIMITED SPECTRAL RANGE BETWEEN 0.6 AND 0.7 MICRON. THIS PROVIDED MORE CONTRAST THAN THE SR BETWEEN THE EARTH AND CLOUDS BY REDUCING THE EFFECT OF HAZE. THE SECOND CHANNEL MEASURED INFRARED RADIATION EMITTED FROM THE EARTH, SEA, AND CLOUD TOPS IN THE 10.5- TO 12.5-MICRON REGION. THIS SPECTRAL REGION PERMITTED BOTH DAYTIME AND NIGHTTIME RADIANCE MEASUREMENTS. THE VHRR FORMED AN IMAGE BY USING A SCANNING MIRROR TECHNIQUE SIMILAR TO THE SR, EXCEPT THAT BOTH RADIOMETERS OPERATED SIMULTANEOUSLY. AS THE SATELLITE PROCEEDED IN ITS ORBIT, THE 400-RPM REVOLVING MIRRORS SCANNED THE EARTH'S SURFACE 180 DEG OUT OF PHASE (ONE MIRROR AT A TIME) AND PERPENDICULAR TO THE ORBIT PATH. THE VISIBLE AND INFRARED DATA WERE TIME-MULTIPLIED SO THAT THE SCAN OF THE INFRARED CHANNEL WAS TRANSMITTED FIRST, FOLLOWED BY THE EARTH SCAN. PORTION OF THE VISIBLE CHANNEL. THIS PROCESS WAS REPEATED 400 TIMES PER MINUTE (EQUIVALENT TO THE SCAN RATE). IF ONE OF THE RADIOMETERS FAILED, THE SYSTEM WAS STILL CAPABLE OF MEASURING BOTH VISIBLE AND INFRARED RADIATION USING ONLY THE REMAINING RADIOMETER. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WAS HANDLED BY NOAA AND EVENTUALLY WILL BE ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NC. IDENTICAL EXPERIMENTS WERE FLOWN ON ITOS-D, -E, AND -G.

***** NOAA 4 *****

SPACECRAFT COMMON NAME- NOAA 4

ALTERNATE NAMES- ITOS-G

NESSDC ID- ITOS-G

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 11/15/74 SPACECRAFT WEIGHT- 409. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NOAA-NESS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC

ORBIT PERIOD- 115.2 MI

PERIAPSIS- 1460.00 KM

INCLINATION- 102. DEG

APOAPSIS- 1460.00 KM ALT

SPACECRAFT PERSONNEL

PM - S. WEILAND

MANAGER, PS=PROJECT SCIENTIST)

NASA-GSFC

PS - I. L. GILLOP

GREENBELT, MD

NASA-GSFC

GREENBELT, MD

SPACECRAFT BODY

ITOS-F

OF ONE IN A SERIES OF IMPROVED TIROS-N TYPE SATELLITES WILL BE LAUNCHED WITH NEW METEOROLOGICAL SENSORS ON BOARD TO EXPAND THE OPERATIONAL CAPABILITY OF THE ITOS (NOAA) SYSTEM. THE PRIMARY OBJECTIVES OF THE ITOS-G METEOROLOGICAL SATELLITE WILL BE TO PROVIDE GLOBAL DAYTIME AND NIGHTTIME DIRECT READOUT CLOUDCOVER DATA ON A DAILY BASIS. THE SUN-SYNCHRONOUS SPACECRAFT WILL ALSO BE CAPABLE OF SUPPLYING GLOBAL ATMOSPHERIC TEMPERATURE SOUNDINGS AND VERY HIGH RESOLUTION INFRARED CLOUDCOVER DATA OF SELECTED AREAS IN EITHER A DIRECT READOUT OR A TAPE RECORDER MODE. A SECONDARY OBJECTIVE WILL BE TO OBTAIN GLOBAL SOLAR PROTON DENSITY DATA ON A DAILY BASIS. THE PRIMARY SENSORS WILL CONSIST OF A VERY HIGH RESOLUTION RADIOMETER (VHRR), A VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR), AND A SCANNING RADIOMETER (SR). THE VHRR, VTPR, AND SR WILL BE MOUNTED ON THE SATELLITE BASEPLATE WITH THEIR OPTICAL AXES DIRECTED VERTICALLY FORWARD. THE NEARLY CUBICAL SPACECRAFT WILL MEASURE 1 BY 1 BY 1.2 M. THE SATELLITE WILL BE EQUIPPED WITH THREE CURVED SOLAR PANELS THAT WILL BE FOLDED DURING LAUNCH

AND DEPLOYED AFTER ORBIT IS ACHIEVED. EACH PANEL WILL MEASURE OVER 4.2 M IN LENGTH WHEN UNFOLDED AND WILL BE COVERED WITH 3420 SOLAR CELLS MEASURING 2 BY 2 CM. THE ITOS DYNAMICS AND ATTITUDE CONTROL SYSTEM WILL MAINTAIN DESIRED SPACECRAFT ORIENTATION THROUGH GYROSCOPIC PRINCIPLES INCORPORATED INTO THE SATELLITE DESIGN. EARTH ORIENTATION OF THE SATELLITE BODY WILL BE MAINTAINED BY TAKING ADVANTAGE OF THE PRECESSION INDUCED FROM A MOMENTUM FLYWHEEL SO THAT THE SATELLITE BODY PRECESSION RATE OF ONE REVOLUTION PER ORBIT WILL PROVIDE THE DESIRED 'EARTH LOOKING' ATTITUDE. MINOR ADJUSTMENTS IN ATTITUDE AND ORIENTATION WILL BE MADE BY MEANS OF MAGNETIC COILS AND BY VARYING THE SPEED OF THE MOMENTUM FLYWHEEL.

----- NOAA 4, OSTROM -----

EXPERIMENT NAME- SOLAR PROTON MONITOR

NESSDC ID- ITOS-G -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.O. OSTROMAPPLIED PHYSICS LAB
SILVER SPRING, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONTINUE THE ITOS SERIES OF JMW/APL EXPERIMENTS, WHICH ARE ALL TO BE THE SAME THROUGH ITOS-F. THREE SOLID-STATE DETECTORS WILL MONITOR THE OMNIDIRECTIONAL FLUXES OF SOLAR PROTONS WITH ENERGIES ABOVE 10, 30, AND 60 MEV, RESPECTIVELY. TWO TELESCOPES CONSISTING OF SOLID-STATE DETECTORS WILL EACH MEASURE DIRECTIONAL FLUXES OF PROTONS BETWEEN 0.27 MEV AND 3.2 MEV (IN THREE INTERVALS), PROTONS BETWEEN 3.2 AND 60 MEV, PROTONS ABOVE 60 MEV, AND ALPHA PARTICLES BETWEEN 12.5 AND 32 MEV. IN THE POLAR CAP REGION WHICH IS OF THE GREATEST INTEREST, THE TELESCOPES WILL VIEW PARALLEL TO, AND PERPENDICULAR TO, THE LOCAL MAGNETIC FIELD DIRECTION. AN ADDITIONAL SOLID STATE DETECTOR WILL MEASURE DIRECTIONAL FLUXES OF ELECTRONS OF ENERGIES GREATER THAN 140 KEV. THIS DETECTOR WILL LOOK IN A DIRECTION PERPENDICULAR TO THE ORBIT PLANE. THE EXPERIMENTER HAS NOT YET DETERMINED WHETHER MINOR CHANGES WILL BE IMPLEMENTED FOR THIS ITOS-G EXPERIMENT.

----- NOAA 4, NESS STAFF -----

EXPERIMENT NAME- SCANNING RADIOMETER (SR)

NESSDC ID- ITOS-G -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFFNOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE ITOS-G SCANNING RADIOMETER (SR) SUBSYSTEM WILL CONSIST OF TWO SCANNING RADIOMETERS, A DUAL SR PROCESSOR, AND TWO SR RECORDERS. THIS SUBSYSTEM WILL PERMIT THE DETERMINATION OF SURFACE TEMPERATURES OF THE GROUND, THE SEA, OR CLOUD TOPS VIEWED BY THE RADIOMETER. THE RADIOMETER WILL MEASURE REFLECTED RADIATION FROM THE EARTH/ATMOSPHERE SYSTEM IN THE 0.62- TO 0.73-MICRON BAND DURING THE DAY AND EMITTED RADIATION FROM THE EARTH AND ITS ATMOSPHERE IN THE 10.5- TO 12.5-MICRON REGION DURING THE DAY AND NIGHT. UNLIKE A CAMERA, THE SR WILL NOT TAKE A PICTURE BUT INSTEAD WILL FORM AN IMAGE USING A CONTINUOUSLY ROTATING MIRROR. THE MIRROR WILL SCAN THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S ORBITAL PATH AT A RATE OF 48 RPM. AS THE SATELLITE PROGRESSES ALONG ITS ORBITAL PATH, EACH ROTATION OF THE MIRROR WILL PROVIDE ONE SCAN LINE OF PICTURE. RADIATION COLLECTED BY THE MIRROR WILL BE PASSED THROUGH A BEAM SPLITTER AND SPECTRAL FILTER TO PRODUCE THE DESIRED SPECTRAL SEPARATION. UP TO TWO FULL ORBITS OF DATA (145 MIN) CAN BE STORED ON MAGNETIC TAPE FOR SUBSEQUENT TRANSMISSION (1697.5 MHZ) TO AN ACQUISITION STATION. THE DATA CAN ALSO BE TRANSMITTED IN REAL TIME TO LOCAL APT STATIONS. ONCE THE SIGNAL IS RECEIVED BY THE GROUND STATION, A CONTINUOUS PICTURE WILL BE FORMED BY USING A FRAME-TO-FRAME RECORDER WHOSE SCAN IS IN PHASE WITH THE SATELLITE'S FORWARD MOTION. FROM A PLANNED ALTITUDE OF 1460 KM, THE RADIOMETER WILL HAVE A GROUND RESOLUTION OF APPROXIMATELY 4 KM AT NAUGHT AND WILL BE CAPABLE OF YIELDING RADIANCE TEMPERATURES BETWEEN 185 AND 330 DEG K TO AN ACCURACY OF +8 AND -1 DEG K, RESPECTIVELY. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-D, -E, AND -F.

----- NOAA 4, NESS STAFF -----

EXPERIMENT NAME- VERY HIGH RESOLUTION RADIOMETER (VHRR)

NESSDC ID- ITOS-G -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFFNOAA-NESS
SUITLAND, MD

THE VERY HIGH RESOLUTION RADIOMETER (VHRR) EXPERIMENT IS DESIGNED TO CONTINUOUSLY MEASURE SURFACE TEMPERATURES OF THE EARTH, SEA, AND CLOUD TOPS IN DAYLIGHT AS WELL AS AT NIGHT AND TO TRANSMIT THE TEMPERATURE DATA IN REAL TIME TO COMMAND AND DATA ACQUISITION (CDA) STATIONS THROUGHOUT THE WORLD FOR USE IN LOCAL WEATHER FORECASTING. THE SPACECRAFT CAN BE PROGRAMMED TO RECORD UP TO 9 MIN OF DATA FOR REMOTE AREAS WHERE NO CDA STATION IS WITHIN RANGE OF THE SPACECRAFT, WITH THE RECORDED DATA BEING PLAYED BACK TO THE NEXT CDA STATION THAT THE SPACECRAFT PASSES. THE EXPERIMENT WILL INCLUDE TWO SCANNING RADIOMETERS, A MAGNETIC TAPE RECORDER, AND ASSOCIATED ELECTRONICS. THE TWO-CHANNEL VHRR WILL OPERATE SIMILARLY TO THE SCANNING RADIOMETER (SR) BUT WITH MUCH GREATER RESOLUTION (0.5 KM COMPARED TO A KM FOR THE SR AT NAHRI). ONE CHANNEL WILL MEASURE REFLECTED VISUAL RADIATION FROM CLOUD TOPS IN THE LIMITED SPECTRAL RANGE BETWEEN 0.6 AND 0.7 MICRON. THIS WILL PROVIDE MORE CONTRAST THAN THE SR BETWEEN THE EARTH AND CLOUDS BY REDUCING THE EFFECT OF HAZE. THE SECOND CHANNEL WILL MEASURE INFRARED RADIATION EMITTED FROM THE EARTH, SEA, AND CLOUD TOPS IN THE 10.5- TO 12.5-MICRON REGION. THIS SPECTRAL REGION WILL PERMIT BOTH DAYTIME AND NIGHTTIME RADIATION MEASUREMENTS. THE VHRR WILL FORM AN IMAGE BY USING A SCANNING MIRROR TECHNIQUE SIMILAR TO THE SR, EXCEPT THAT BOTH RADIOMETERS WILL OPERATE SIMULTANEOUSLY. AS WITH THE SR, THE SATELLITE PROCEEDS IN ITS ORBIT, TWO 400-RPM REVOLVING MIRRORS WILL SCAN THE EARTH'S SURFACE 100 DEG OUT OF PHASE (ONE MIRROR AT A TIME) IN A LINE PERPENDICULAR TO THE ORBIT PATH, THE VISIBLE AND INFRARED DATA WILL BE TIME-MULTIPLIED SO THAT THE SCAN OF THE INFRARED CHANNEL WILL BE TRANSMITTED FIRST, FOLLOWED BY THE EARTH SCAN PORTION OF THE VISIBLE CHANNEL. THIS PROCESS WILL BE REPEATED 400 TIMES PER MINUTE (EQUIVALENT TO THE SCAN RATE). IF ONE OF THE RADIOMETERS FAILS, THE SYSTEM WILL STILL BE CAPABLE OF MEASURING BOTH VISIBLE AND INFRARED RADIATION USING ONLY THE REMAINING RADIOMETER. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NDAAs AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ONITOS-EE, -FF, AND -GG.

----- NDAA 4, NESS STAFF

EXPERIMENT NAME- VERTICAL TEMPERATURE PROFILE RADIOMETER
(VTPR)

NSAIDC 1D- 1725-G -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFFNOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE ITOS-G VERTICAL TEMPERATURE PROFILE RADIOMETER (VTPR) WILL SENSE THE RADIANT ENERGY FROM ATMOSPHERIC CARBON DIOXIDE IN SIX NARROW SPECTRAL REGIONS CENTERED AT 13.0, 14.0, 14.5, 14.1, 13.9, AND 13.4 MICRONS. THE GROSS ATMOSPHERIC WATER VAPOR CONTENT WILL BE DETERMINED FROM MEASUREMENTS CENTERED AT 18.7 MICRONS. MEASUREMENTS WILL ALSO BE TAKEN IN THE 12.0-MICRON SPECTRAL REGION TO DETERMINE SURFACE/CLOUDTOP TEMPERATURES. THE VTPR WILL CONSIST OF AN OPTICAL SYSTEM, DETECTOR AND ASSOCIATED ELECTRONICS, AND A SCANNING MIRROR. THE MIRROR WILL SCAN THE EARTH'S SURFACE PERPENDICULAR TO THE SATELLITE'S ORBITAL PATH. AS EACH AREA IS SCANNED, THE OPTICAL SYSTEM WILL COLLECT, FILTER, AND DETECT THE RADIATION FROM THE EARTH AND SEPARATE IT INTO THE EIGHT SPECTRAL INTERVALS. THE GROUND AREA COVERED BY ONE SAMPLE OF DATA WILL BE APPROXIMATELY 50 BY 50 KM. THE RADIOMETER WILL OPERATE CONTINUOUSLY, TAKING MEASUREMENTS OVER EVERY PART OF THE EARTH'S SURFACE TWICE A DAY. THE DATA WILL BE RECORDED THROUGHOUT THE ORBIT AND WILL BE PLAYED BACK UPON COMMAND WHEN THE SATELLITE IS WITHIN COMMUNICATION RANGE OF A COMMAND AND DATA ACQUISITION STATION. GROUND PERSONNEL WILL USE THE DATA TO COMPUTE TEMPERATURE-PRESSURE PROFILES TO ALTITUDES AS HIGH AS 30 KM. ALL OPERATIONAL DATA FROM THIS EXPERIMENT WILL BE HANDLED BY NOAA AND EVENTUALLY ARCHIVED AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE, NORTH CAROLINA. IDENTICAL EXPERIMENTS WILL BE FLOWN ON ITOS-D, -E, AND -F.

山南水北，物产丰富，人口众多，经济发达。PAN 3 年本市经济和人口增长迅速。

SPACECRAFT COMMON NAME- DAO 3
ALTERNATE NAMES- PL-701D, DAO-C
COPERNICUS, 06193
NSSDC ID- 72-065A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 08/21/72.

LAUNCH DATE- 08/21/72 SPACECRAFT WEIGHT- 2150. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

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INITIAL ORBIT PARAMETERS
ORBIT TYPE- GECENTRIC
ORBIT PERIOD- 99.7 MIN
PERIAPSIS- 739.000 KM ALT
EPOCH DATE- 08/21/72
INCLINATION- 35.012 DEG
APNAPSIS- 751.000 KM ALT

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RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 99.705 MIN
PERIAPSIS- 730.60 KM ALT

EPOCH DATE- 08/07/74
INCLINATION- 35.011 DEG
APOAPSIS- 750.23 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM = J. PURCELLNASA-GSFC
GREENBELT, MD
PS = J.E. KUPFERIAN, JR.NASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

SPACECRAFT BRIEF DESCRIPTION THE MISSION OF THE QAO PROGRAM TO OBSERVE THE CELESTIAL SPHERE FROM ABOVE THE EARTH'S ATMOSPHERE. A SPECTROMETER MEASURED HIGH-RESOLUTION SPECTRA OF THE STARS, GALAXIES, PLANETS, NEBULAE, THE SUN, ETC., IN THE ULTRAVIOLET REGION OF THE SPECTRUM. THREE SMALL X-RAY TELESCOPES STUDIED X-RAY RADIATION IN THREE PASSBANDS BETWEEN 3 Å AND 60 Å. THE QAO-C SPACECRAFT WAS A GROUND-CONTROLLABLE SPACEFLYER THAT WAS PLACED IN A LOW-ALTITUDE EARTH ORBIT. THE SPACECRAFT SHAPE WAS THAT OF AN OCTAGONAL CYLINDER WITH EXTENDABLE SOLAR PANELS. THE SILICON SOLAR CELL ARRAY SUPPLIED 30 W AND 60 W PEAK POWER. DATA WAS TRANSMITTED IN BOTH REAL TIME AND DELAYED TIME.

----- DAO 3: BOYO -----
EXPERIMENT NAME- STELLAR PHOTOMETRY

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/00/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.L.F. BOYD U COLLEGE LONDON
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED THREE TELESCOPES AND A COLLIMATED PROPORTIONAL COUNTER TO OBSERVE COSMIC X-RAY SOURCES BETWEEN 1 AND 70 Å. BETWEEN 1 AND 3 ÅNGSTRÖMS A PROPORTIONAL COUNTER LOCATED BEHIND A COLLIMATOR WAS USED IN CONJUNCTION WITH PULSE-SHAPE DISCRIMINATION TO REJECT BACKGROUND COUNTS. FROM 3 TO 6 Å AND 6 TO 10 Å, PROPORTIONAL COUNTERS LOCATED AT THE FOCUS OF TWO GRAZING-INCIDENCE REFLECTING TELESCOPES (15.5 90 CM AND 12 90 CM, RESPECTIVELY) WERE USED. WITH AN ANTICINCIDENCE SCINTILLATOR ALSO EMPLOYED TO REJECT BACKGROUND COSMIC RAY COUNTS, AN OPEN CHANNEL MULTIPLIER LOCATED AT THE FOCUS OF A GRAZING INCIDENCE TELESCOPE (23 90 CM) WAS USED TO OBSERVE BETWEEN 20 AND 70 Å. DATA FROM THIS EXPERIMENT WERE USED TO DETERMINE THE INTERSTELLAR ABSORPTION OF SOFT X RAYS. THE 3- TO 9-Å AND 6- TO 10-Å DETECTORS, ALIED IN JUNE 1973. THE 20- TO 70-Å DETECTOR APPEARS TO BE QUITE NOISY.

----- DAO 3, SPITZER -----
EXPERIMENT NAME- HIGH RESOLUTION TELESCOPES

NSSDC ID# 72-065A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 08/21/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - L. SPITZERPRINCETON U
PRINCETON, NJ
OI - J. ... JR.PRINCETON U
PRINCETON, NJ

EXPERIMENT BRIEF DESCRIPTION

THE PRIMARY OBJECTIVE OF THIS EXPERIMENT WAS TO MAKE QUANTITATIVE OBSERVATIONS OF THE INTERSTELLAR ABSORPTION LINES IN THE SPECTRAL REGION 1000 TO 3300 Å. THE SECONDARY OBJECTIVE WAS TO OBSERVE THE ULTRAVIOLET SPECTRA OF SELECTED BRIGHTEN STARS IN DETAIL. THE PRIME OPTICAL SYSTEM WAS AN 80-CM DIAM CASSEGRAIN TELESCOPE WITH A 16-M FOCAL LENGTH (F/20). THIS TELESCOPE WAS COUPLED TO A PASCHEN-RUNGE SPECTROMETER CAPABLE OF 0.1-Å RESOLUTION IN FIRST ORDER AND 0.05-Å RESOLUTION IN SECOND ORDER. THE PHOTONS WERE DETECTED BY FOUR EMR PHOTOTUBES, EACH EQUIPPED WITH ITS OWN EXIT SLIT, AND MOVABLE IN PAIRS ALONG THE ROWLAND CIRCLE. A GUIDANCE ERROR SENSOR ATTACHED TO THE PRIME OPTICS CONTROLLED THE SPACECRAFT ATTITUDE TO WITHIN 0.1 ARC-SEC. THIS GUIDANCE SYSTEM LOCKED ONTO A STAR AS WEAK AS 7TH MAGNITUDE. THE OVERALL SYSTEM COULD MAKE USEFUL MEASUREMENTS ON O- AND B-TYPE STARS OF 7TH MAGNITUDE.

***** ONE METER UV TELESCOPE *****
SPACECRAFT COMMON NAME- ONE METER UV TELESCOPE
ALTERNATE NAMES- SPACELAB ASTRONOMY MISC. SPACELAB 1M UV TELESC
NSSOC ID- 04UUTEL

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- 1982 SPACECRAFT WEIGHT- KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- SHUTTLE

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-055

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 90. MIN
PERIAPSIS- 300. KM ALT INCLINATION- 29. DEG
APOAPSIS- 300. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.S. LECKONENASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
ON 6 THE 1980'S NASA WILL BE USING THE SPACE SHUTTLE AS ITS PRIMARY TRANSPORTATION SYSTEM FOR CARRYING INSTRUMENTATION INTO NEAR-EARTH ORBIT. UNDER THE SPACELAB PROGRAM THE SHUTTLE'S PAYLOAD BAY IS BEING CONFIGURED AND EQUIPPED TO ACT AS A GENERALIZED IN-ORBIT LABORATORY. THE SPACELAB EFFORT IS DIRECTED BY THE EUROPEAN SPACE RESEARCH ORGANIZATION (ESRO). ONE OF THE PROPOSED SPACECRAFT MISSIONS IS THE FLYING OF A 1-METER TELESCOPE CAPABLE OF PERFORMING NONSOLAR-ASTRONOMICAL OBSERVATIONS FROM THE VACUUM ULTRAVIOLET (UV) THROUGH THE VISIBLE WAVELENGTH RANGE. THE INITIAL DEFINITION OF THE REQUIREMENTS ON THIS 1-M UV-OPTICAL SPACELAB TELESCOPE AND ITS RELATED SUPPORT SYSTEMS WILL BEGIN IN DECEMBER 1974. THE ORGANIZATION AND IMPLEMENTATION OF THE UV-OPTICAL TELESCOPE STUDY WILL BE CARRIED OUT BY AN INSTRUMENT DEFINITION TEAM (IDT). THE MEMBERS OF THIS IDT WILL BE CHOSEN FROM SCIENTISTS FROM THROUGHOUT THE WORLD ON THE BASIS OF SUBMITTED PROPOSALS. THIS IDT WILL INTERACT WITH NASA THROUGH THE NASA STUDY SCIENTIST, A GODDARD SPACE FLIGHT CENTER APPOINTEE. THE SIGNIFICANT DATES OF THIS PHASE A EFFORT ARE AS FOLLOWS: (1) MAY 3, 1974 - ISSUANCE OF THE ANNOUNCEMENT OF OPPORTUNITIES FOR PARTICIPATION IN THE DEFINITION OF A ONE METER CLASS ULTRAVIOLET-OPTICAL FACILITY TELESCOPE FOR SPACELAB ASTRONOMY MISSIONS. (2) JULY 22, 1974 - DEADLINE FOR THE RECEIPT OF PROPOSALS. (3) NOVEMBER 1974 - ANNOUNCEMENT OF PROPOSAL SELECTION. (4) DECEMBER 1974 - INITIAL IDT MEETING. (5) MAY 1975 - PRELIMINARY IDT REPORT. (6) DECEMBER 1975 - FINAL IDT REPORT.

***** OSD 5 *****

SPACECRAFT COMMON NAME- OSD 5
ALTERNATE NAMES- OSD-F, PL-686A
03663
NSSDC ID- 69-006A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/15/74.

LAUNCH DATE- 01/22/69 SPACECRAFT WEIGHT- 645. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSDA

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 01/22/69
ORBIT PERIOD- 95.77 MIN INCLINATION- 32.965 DEG
PERIAPSIS- 532.000 KM ALT APOAPSIS- 570.000 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 01/22/69
ORBIT PERIOD- 95.77 MIN INCLINATION- 32.965 DEG
PERIAPSIS- 532.000 KM ALT APOAPSIS- 570.000 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.H. PICKARDNASA-GSFC
GREENBELT, MD
PS - S.P. HANANNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE OBJECTIVES OF THE OSD 5 SATELLITE SERIES WERE TO PERFORM SOLAR PHYSICS EXPERIMENTS ABOVE THE ATMOSPHERE DURING A COMPLETE SOLAR CYCLE AND TO MAP THE ENTIRE CELESTIAL SPHERE FOR DIRECTION AND INTENSITY OF UV LIGHT, X-RAY, AND GAMMA RADIATION. THE OSD 5 PLATFORM CONSISTED OF A 'SAIL' SECTION THAT POINTED TWO EXPERIMENTS CONTINUALLY TOWARD THE SUN AND A 'WHEEL' SECTION THAT SPUN ABOUT AN AXIS PERPENDICULAR TO THE POINTING DIRECTION OF THE SAIL AND CARRIED SIX EXPERIMENTS. ATTITUDE ADJUSTMENTS WERE PERFORMED BY GAS JETS AND A MAGNETIC TORQUING COIL. POINTING CONTROL PERMITTED THE POINTED EXPERIMENTS TO SCAN THE REGION OF THE SOLAR DISK IN A 40- BY 40-ARC-MIN RASTER PATTERN. IN ADDITION, THE POINTED SECTION COULD BE COMMANDED TO SELECT AND SCAN A 7- BY 7-ARC-MIN REGION NEAR THE SOLAR DISK. DATA WERE SIMULTANEOUSLY RECORDED ON TAPE AND TRANSMITTED BY PCM/PM TELEMETRY. A COMMAND SYSTEM PROVIDED FOR 155 GROUND-BASED COMMANDS. THE SPACECRAFT WAS COMMANDED OFF ON DECEMBER 31, 1972. AFTER THE REENTRY OF OSD 7 IN JULY 1974, THE OSD 5 SPACECRAFT WAS COMMANDED BACK ON IN JULY 1974.

***** OSD 5, BLANMONT *****

EXPERIMENT NAME- MEASUREMENT OF THE SELF REVERSAL OF THE
SOLAR LYMAN ALPHA LINE

NSSDC ID- 69-006A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/15/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.E. BLANMONTCNES
PARIS, FRANCE

OI - P. COUFLEAUU OF PARIS
PARIS, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS FLIGHT INSTRUMENT WAS DESIGNED FOR STUDYING THE LINE SHAPE OF THE SOLAR LYMAN-ALPHA LINE SUMMED OVER THE ENTIRE SOLAR DISK. IT MADE USE OF THE OPTICAL RESONANCE OF HYDROGEN AND DEUTERIUM GASES. A GRATING AND MIRROR SYSTEM CONVERTED THE INCIDENT SOLAR RADIATION INTO A BEAM OF LYMAN-ALPHA LIGHT (1216 A) WITH A BANDWIDTH OF 100 A, WHICH ENTERED TWO RESONANCE CELLS. ONE CELL WAS FILLED WITH MOLECULAR HYDROGEN AND THE OTHER CELL WAS FILLED WITH MOLECULAR DEUTERIUM GAS. EACH CELL HAD A PHOTOMULTIPLIER MOUNTED AT ITS EXIT WINDOW TO MEASURE THE TOTAL INTENSITY OF THE SOLAR SPECTRUM IN THE 100-A BANDWIDTH. IN ADDITION, EACH CELL HAD A PHOTOMULTIPLIER MOUNTED AT RIGHT ANGLES TO THE CELL (I. E., AT RIGHT ANGLES TO THE INCIDENT BEAM) THAT MEASURED THE INTENSITY OF THE LIGHT SCATTERED BY THE CELL. HEATED FILAMENTS IN THESE CELLS DISSOCIATED SOME OF THE GAS, AND DIFFERENT CONCENTRATIONS OF ATOMIC SPECIES IN THE CELLS WERE OBTAINED BY VARYING FILAMENT VOLTAGE. THE SIGNAL ON THE RIGHT ANGLE DETECTORS WAS PROPORTIONAL TO THE INTENSITY OF THE INCIDENT LIGHT AT 1215.664 A FOR THE HYDROGEN CELL (0.015 A BANDWIDTH) AND AT 1215.334 A FOR THE DEUTERIUM CELL (0.011 A). SCANNING WAS ACCOMPLISHED BY A DOPPLER SHIFT DUE TO APPROACHING AND RECEDING VELOCITY OF THE SPACECRAFT WITH RELATION TO THE SUN AT ORBIT MORNING AND EVENING. AN INTERNAL CALIBRATION LAMP WAS INCLUDED IN THE EXPERIMENT. THE EXPERIMENT OPERATED ONE HR EVERY TWO CALENDAR DAYS, AND AFTER TWO YRS OF OPERATION IT WAS STILL FUNCTIONING PROPERLY. MORE EXPERIMENT DETAILS AND SOME MEASURED DATA ARE CONTAINED IN THE PAPER, 'SOLAR LYMAN-ALPHA CHANGES AND RELATED HYDROGEN DENSITY DISTRIBUTION AT THE EARTH'S EXPOSURE (1969-1970),' A. VIDAL-MAJAR, ET AL, JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 78, NO. 7, PP. 1115 (1973).

***** OSD 5, BOYD *****

EXPERIMENT NAME- X RAY SPECTROMELIOGRAPH

NSSDC ID- 69-006A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/15/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.L.F. BOYDU COLLEGE LONDON
LONDON, ENGLAND
OI - E.A. STEWARDSONU COLLEGE LONDON
LONDON, ENGLAND
OI - P.A. WILLMOREU COLLEGE LONDON
LONDON, ENGLAND
OI - K.A. POUNDSU OF LEICESTER
LEICESTER, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

PROPORTIONAL COUNTERS ATTACHED TO COLLIMATORS PROVIDED 8-CHANNEL SPECTRAL INFORMATION AS WELL AS THE SPATIAL DISTRIBUTION OF SOLAR X-RAY SOURCES. IN THE 8- TO 18-A REGION, THE COLLIMATOR WAS A GRAZING INCIDENCE PARADOXIC REFLECTOR WHICH YIELDED AN ANGULAR RESOLUTION OF PLUS OR MINUS 1 ARC-MIN. IN THE 3- TO 9-A REGION, TWO PARALLEL SLITS COLLIMATED THE RADIATION IN ONE DIMENSION ONLY (3.3 ARC-MIN).

***** OSD 5, NEY *****

EXPERIMENT NAME- ZODIACAL LIGHT MONITOR

NSSDC ID- 69-006A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 07/15/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - E. NEYU OF MINNESOTA
MINNEAPOLIS, MN

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, A MODIFIED VERSION OF AN OSD 2 EXPERIMENT (66-007A-04), WAS DESIGNED TO MEASURE THE INTENSITY AND DEGREE OF POLARIZATION OF ZODIACAL LIGHT AS A FUNCTION OF ECLIPTIC LATITUDE AND TO SEARCH FOR CHANGES IN ZODIACAL LIGHT RESULTING FROM SOLAR DISTURBANCES. IT WAS ALSO INTENDED TO STUDY THE INTENSITY OF THE AIRGLOW CONTINUUM LAYER AND TO STUDY THE DISTRIBUTION OF NIGHTTIME LIGHTNING STORMS. SIX PHOTOMULTIPLIER/FILTER PHOTOMETERS WERE USED WITH VARIOUS APERTURES AND ORIENTATIONS. THESE PHOTOMETERS WERE PM-1, PM-2, PM-3, PM-4, PM-5, AND PM-6. PM-1 WAS ORIENTED PARALLEL TO THE SPIN AXIS WITH A 9.25- BY 57-DEG FIELD OF VIEW AND A RED/VISUAL PASSBAND. PM-2 WAS ORIENTED ANTIPARALLEL TO THE SPIN AXIS WITH A 9.25- BY 57-DEG FIELD OF VIEW AND A BLUE (3500 TO 5000 A) PASSBAND. PM-3 WAS ORIENTED PARALLEL TO THE SPIN AXIS WITH AN 11-DEG-DIAMETER CONICAL FIELD OF VIEW AND A BLUE (3500 TO 5000 A) PASSBAND. PM-4 WAS ORIENTED PARALLEL TO THE SPIN AXIS WITH A 10.5-DEG OFFSET. A 9.5-DEG-DIAMETER CONICAL FIELD OF VIEW, AND A BLUE (3500 TO 5000 A) PASSBAND. PM-5 WAS ORIENTED ANTIPARALLEL TO THE SPIN AXIS WITH A 9-DEG-DIAMETER CONICAL FIELD OF VIEW AND A RED (6000 TO 8500 A) PASSBAND. PM-6 WAS ORIENTED ANTIPARALLEL TO THE SPIN AXIS WITH A 9-DEG OFFSET. A 9.5-DEG-DIAMETER FIELD OF VIEW AND A VISUAL/RED PASSBAND. PM-1, PM-2, AND PM-3 WERE READ OUT THREE TIMES DURING EACH SPACECRAFT MAIN FRAME (TELEMETRY), AND PM-4, PM-5, AND PM-6 WERE READ OUT TWICE DURING EACH SPACECRAFT MAIN FRAME. THESE PHOTOMETERS MEASURED LIGHT INTENSITY UP TO ABOUT 1000 TIMES THAT OF A TENTH MAGNITUDE STAR, ON A SCALE FROM 0

TO 4096. PM-3, PM-4, AND PM-5 WERE EQUIPPED WITH FIXED POLAROID FILTERS. IN ADDITION, TWO PHOTODIODES, EACH WITH A SENSITIVITY ABOUT ONE-SIXTEENTH THAT OF THE PHOTOMETERS, FUNCTIONED AS MONITOR EYES AND WERE SAMPLED ONCE EVERY 5 SEC. EYE-1 WAS ORIENTED PARALLEL TO THE SPIN AXIS WITH A 10.5-DEG OFFSET AND HAD A 21-DEG-DIAMETER CONICAL FIELD OF VIEW. EYE-2 WAS ORIENTED ANTIPARALLEL TO THE SPIN AXIS, OFFSET BY 6 DEG, AND HAD A 17.5-DEG DIAMETER FIELD OF VIEW.

***** OSO-1 *****

SPACECRAFT COMMON NAME- OSO-1
ALTERNATE NAMES- OSO-EYE, PL-7310
NSSDC ID- OSO-1

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 1 QTR 75 SPACECRAFT WEIGHT- 4280. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 96. MIN INCLINATION- 33. DEG
PERIAPSIS- 550.000 KM ALT APOAPSIS- 550.000 KM ALT

SPACECRAFT PERSONNEL (PI=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.H. PICKARDNASA-GSFC
PS - S.P. MARRANNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE OBJECTIVES OF THE OSO SATELLITE SERIES WILL BE TO PERFORM SOLAR PHYSICS EXPERIMENTS ABOVE THE ATMOSPHERE DURING A COMPLETE SOLAR CYCLE AND TO MAP THE ENTIRE CELESTIAL SPHERE FOR DIRECTION AND INTENSITY OF UV LIGHT, X-RAY AND GAMMA RADIATION. THE OSO-1 PLATFORM WILL CONSIST OF A 'SAIL' SECTION, WHICH WILL POINT TWO EXPERIMENTS CONTINUALLY TOWARD THE SUN, AND A 'WHEEL' SECTION, WHICH WILL SPIN ABOUT AN AXIS PERPENDICULAR TO THE POINTING DIRECTION OF THE SAIL AND WILL CARRY FIVE EXPERIMENTS. ATTITUDE ADJUSTMENT WILL BE PERFORMED BY GAS JETS AND A MAGNETIC TORQUING COIL. POINTING CONTROL WILL PERMIT THE POINTED EXPERIMENTS TO SCAN THE REGION OF THE SOLAR DISK IN A 40- X 40-ARC-MIN TO 60- X 60-ARC-MIN RASTER PATTERN. IN ADDITION, THE POINTED SECTION MAY BE COMMANDED TO SELECT AND SCAN A 1- X 1-ARC-MIN OR 5- X 5-ARC-MIN REGION ANYWHERE ON THE SOLAR DISK. DATA WILL BE SIMULTANEOUSLY RECORDED ON TAPE AND TRANSMITTED BY PCM/PM TELEMETRY. A COMMAND SYSTEM WILL PROVIDE FOR AT LEAST 512 GROUND-BASED COMMANDS.

----- OSO-1, ACTON -----

EXPERIMENT NAME- MAPPING X-RAY HELIOMETER

NSSDC ID- OSO-1 -04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - L.W. ACTONLOCKHEED PALO ALTO
OI - J.L. CULHANELOCKHEED PALO ALTO
OI - J.C. CATURALOCKHEED PALO ALTO
PALO ALTO, CA

EXPERIMENT BRIEF DESCRIPTION
THE EXPERIMENT IS DESIGNED TO MEASURE THE LOCATION, SPECTRUM, AND INTENSITY OF INTERMEDIATE ENERGY X-RAYS (2- TO 30-KEV) FROM INDIVIDUAL SOLAR ACTIVE REGIONS AND FROM EXTRA-SOLAR X-RAY SOURCES. THE INSTRUMENT WILL CONSIST OF THREE INDEPENDENT X-RAY DETECTION SYSTEMS, EACH COMPOSED OF TWO GAS-FILLED PROPORTIONAL COUNTERS WHICH WILL VIEW SPACE THROUGH A MULTIPLE FAN-BEAM COLLIMATOR. THE FIELD OF VIEW WILL BE 2 ARC-MIN (FULL-WIDTH HALF-MAXIMUM), AND EACH PRIMARY DETECTOR WILL HAVE AN EFFECTIVE AREA OF 100 CM SQ.

----- OSO-1, BOLDT -----

EXPERIMENT NAME- COSMIC X-RAY SPECTROSCOPY

NSSDC ID- OSO-1 -06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - E.A. BOLOTTNASA-GSFC
OI - S.S. HOLTNASA-GSFC
OI - P.J. SERLEWITSOSNASA-GSFC
OI - D. SCHWARTZHARVARD COLLEGE OBS
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
THE EXPERIMENT IS DESIGNED TO OBTAIN THE SPECTRA OF X-RAY SOURCES AND THE DIFFUSE BACKGROUND IN THE ENERGY RANGE

OF 2- TO 40-KEV, USING TWO PROPORTIONAL COUNTERS, ONE FILLED WITH ARGON, THE OTHER WITH XENON TO PRESSURES GREATER THAN 1 ATMOSPHERE. THE ARGON DETECTOR WILL EMPHASIZE ENERGIES BELOW 10 KEV, MECHANICALLY COLLIMATED TO A FIELD OF VIEW OF 1 DEG BY 5 DEG. THE XENON DETECTOR WILL EMPHASIZE ENERGIES ABOVE 10 KEV AND WILL HAVE A FIELD OF VIEW OF 1 DEG BY 20 DEG. THE DETECTORS WILL BE MOUNTED ON THE WHEEL SECTION, SO THAT THEY WILL BOTH BE OFFSET FROM THE SPIN AXIS BY ABOUT 5 DEG.

----- OSO-1, DONNETT -----

EXPERIMENT NAME- CHROMOSPHERE FINE STRUCTURE STUDY

NSSDC ID- OSO-1 -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.M. DONNETTNATL CENT SCI RES-LPSP
VERRIERES-LE-DUISSON, FRANCE
OI - P. LEMAIREU OF PARIS
PARIS, FRANCE
OI - A. VIDAL-MAJARESRO-ESTEC
NOORDWIJK, NETHERLANDS
OI - J.C. VIALNATL CENT SCI RES-LPSP
VERRIERES-LE-DUISSON, FRANCE

EXPERIMENT BRIEF DESCRIPTION
THE EXPERIMENT IS DESIGNED TO MEASURE SOLAR CHROMOSPHERIC SPATIAL AND WAVELENGTH STRUCTURE FOR THE FOLLOWING SPECTRAL LINES IN THE 1000-A TO 4000-A REGION -- LYMAN-ALPHA, LYMAN-BETA, THE H AND K LINES OF MAGNESIUM II, AND THE H AND K LINES OF CALCIUM II. THE INSTRUMENT, WHICH WILL BE COMPOSED OF A CASSEGRAIN TELESCOPE AND A GRATING SPECTROMETER, CAN OPERATE IN TWO MODES - (1) IT CAN HOLD A FIXED SOLAR LOCATION AND SCAN THE SPECTRAL LINES, (2) IT CAN SIMULTANEOUSLY FIX ON THREE OF THE SIX SPECTRAL LINES AND SCAN A 1-ARC-MIN X 1-ARC-MIN REGION OF THE SOLAR DISK.

----- OSO-1, BRUNER, JR. -----

EXPERIMENT NAME- HIGH RESOLUTION ULTRAVIOLET SPECTROMETER MEASUREMENTS

NSSDC ID- OSO-1 -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - E.C. BRUNER, JR.U OF COLORADO
BOULDER, CO
OI - G. ATHAYHIGH ALTITUDE OBS
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION
THE EXPERIMENT IS DESIGNED TO MEASURE SOLAR ULTRAVIOLET LINE SHAPES (FROM 1050 A TO 2200 A IN WAVELENGTH) AND THEIR VARIATION WITH TIME AND POSITION ON THE DISK. THE INSTRUMENT WILL BE AN EBERT-TYPE HIGH-RESOLUTION SPECTROMETER MOUNTED IN THE 750 SAIL, AND WILL HAVE ENOUGH SELF-CONTAINED LOGIC TO OPERATE IN SEVERAL DIFFERENT MODES BY GROUND COMMAND.

----- OSO-1, FROST -----

EXPERIMENT NAME- HIGH-ENERGY CELESTIAL X RAYS

NSSDC ID- OSO-1 -07

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - K.J. FROSTNASA-GSFC
GREENBELT, MD
OI - B.R. DENNISNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE PURPOSE OF THIS EXPERIMENT WILL BE TO MEASURE THE ENERGY SPECTRA OF ALL KNOWN X-RAY SOURCES ABOVE THE INTENSITY THRESHOLD OF 10 TO THE MINUS 6 PHOTONS/CM-SQ-SEC-KEV IN THE ENERGY REGION .01 TO 1 MEV. THE INSTRUMENT WILL CONSIST OF 97-CM-SQ CSI (SODIUM) SCINTILLATION CRYSTALS SURROUNDED BY A HONEYCOMB-TYPE CSI (SODIUM) ANTI-COINCIDENCE COLLIMATOR, WHICH WILL PROVIDE AN ACCEPTANCE ANGLE OF 6.30 DEG FROM THE VIEWING AXIS. THE INSTRUMENT WILL BE MOUNTED ON THE OSO WHEEL SECTION NEARLY PARALLEL TO THE SATELLITE SPIN AXIS.

----- OSO-1, KRAUSHAAR -----

EXPERIMENT NAME- SOFT X-RAY BACKGROUND RADIATION INVESTIGATION

NSSDC ID- OSO-1 -05

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - W.L. KRAUSHAARU OF WISCONSIN
MADISON, WI

01 - A. GUNNERU OF WISCONSIN
MADISON, WI

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MEASURE GALACTIC LATITUDE DEPENDENCE OF THE X-RAY BACKGROUND RADIATION IN THE 0.150- TO 45-KEV REGION, EMPHASIZING THE SOFT X-RAY PORTION. TWO SETS OF THREE PROPORTIONAL COUNTERS MOUNTED ON THE OSO WHEEL WILL VIEW PARALLEL AND ANTIPARALLEL TO THE WHEEL SPIN DIRECTION THROUGH A 4- BY 4-DEG (FULL-WIDTH HALF-MAXIMUM) COLLIMATOR. SENSITIVITY IS EXPECTED TO BE ABOUT 1 PERCENT STATISTICAL ACCURACY NEAR THE GALACTIC POLES, AND ENERGY RESOLUTION WILL BE PROVIDED BY SELECTED FILTERS.

----- OSO-1, NOVICK -----

EXPERIMENT NAME- HIGH-SENSITIVITY GRAPHITE CRYSTAL SPECTROSCOPY OF STELLAR AND SOLAR X RAYS

NSSDC ID- OSO-1 -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R. NOVICKCOLUMBIA U
NEW YORK, NY

OI - J.R.P. ANGELCOLUMBIA U
NEW YORK, NY

OI - P.A. VANDENBOUTCOLUMBIA U
NEW YORK, NY

OI - M. WEISSKOPFCOLUMBIA U
NEW YORK, NY

OI - R.S. WOLFFCOLUMBIA U
NEW YORK, NY

EXPERIMENT BRIEF DESCRIPTION

THE EXPERIMENT IS DESIGNED TO MONITOR CONTINUOUSLY THE SUN'S EMISSION IN THE 2- TO 0-KEV RANGE, AND TO OBTAIN A COMPLETE SPECTRUM IN THAT RANGE EVERY 12 SEC DURING FLARES. THE EXPERIMENT IS ALSO DESIGNED TO OBTAIN HIGH-RESOLUTION SPECTRA OF MANY CELESTIAL X-RAY SOURCES. THE INSTRUMENT WILL BE A SLITLESS IMAGE SPECTROMETER MOUNTED ON THE OSO WHEEL SECTION, WHICH WILL UTILIZE THE WHEEL ROTATION TO PROVIDE SPECTRAL SCANNING. THREE PROPORTIONAL COUNTERS WILL BE COLLIMATED TO OPTIMIZE DETECTION AT 2 KEV, 2.6 KEV, AND 7.2 KEV. RESPECTIVELY, THE GRAPHITE CRYSTAL WILL HAVE A 1000-CO-SO AREA.

----- OSO-1, WELLES, JR. -----

EXPERIMENT NAME- FUV FROM EARTH AND SPACE

NSSDC ID- OSO-1 -08

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.S. WELLES, JR.US NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, MOUNTED IN THE WHEEL SECTION, WILL OBTAIN SPATIAL AND TEMPORAL MEASUREMENTS OF EXTREME ULTRAVIOLET (EUV) EMISSIONS OF HYDROGEN, HELIUM, AND OXYGEN IN THE EARTH'S ATMOSPHERE AND IN INTERPLANETARY AND GALACTIC SPACE. THE INSTRUMENTATION WILL CONSIST OF TWO PHOTOMETERS DESIGNED TO MEASURE EUV RESONANCE RADIATION IN VARIOUS WAVELENGTHS FROM 150 TO 1070 Å AND IN PORTIONS OF THE 1125- TO 1230-Å BAND. EACH PHOTOMETER WILL CONSIST OF A CONTINUOUS CHANNEL ELECTRON MULTIPLIER USED AS A PHOTON DETECTOR, TOGETHER WITH A THIN METAL FILM OF A MAGNESIUM FLUORIDE-OXYGEN CELL TO SERVE AS OPTICAL BANDPASS FILTERS. THERE ARE FOUR SUCH BANDPASS FILTERS -- (1) A THIN FILM OF 1000-Å-THICK AL AND 900-Å-THICK CARBON (BANDWIDTH OF 150 TO 350 Å), (2) A THIN FILM OF 1000-Å-THICK AL (BANDWIDTH OF 150 TO 800 Å), (3) A THIN FILM OF 1500-Å-THICK IODINE (BANDWIDTH OF 740 TO 1070 Å), AND (4) A CELL WITH MAGNESIUM FLUORIDE WINDOWS FILLED WITH ONE ATMOSPHERE OF OXYGEN (BANDWIDTH CONSISTING OF PORTIONS OF 1125 TO 1230 Å). THESE BANDPASS FILTERS WILL BE MOUNTED ON A WHEEL IN FRONT OF THE PHOTOMULTIPLIERS, WHICH WILL BE ROTATED AT REGULAR INTERVALS TO CHANGE THE FILTERS. THIS WILL MAKE TWO OF THE INDICATED WAVELENGTH RANGES OPERATIONAL AT ANY GIVEN TIME. THE INSTRUMENT WILL BE MOUNTED WITH THE PHOTOMETER AXES AT A SMALL ANGLE WITH RESPECT TO THE SATELLITE-SUN LINE AND WITH SUFFICIENT DAFFLING THAT THE PHOTOMETERS WILL NEVER "SEE" THE SUN.

***** OSO-6 *****

SPACECRAFT COMMON NAME- OSO-6
ALTERNATE NAMES- FR 26, OSV51
NSSDC ID- 69-0468

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 05/23/69.

LAUNCH DATE- 05/23/69 SPACECRAFT WEIGHT- 23. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- TITAN 3C

SPONSORING COUNTRY/AGENCY
UNITED STATES DOD-USAF

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 3115.2 MIN
PERIAPSIS- 16923. KM ALT

EPOCH DATE- 05/24/69
INCLINATION- 32.88 DEG
APOAPSIS- 111636. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 3115.5 MIN
PERIAPSIS- 7378.69 KM ALT

EPOCH DATE- 06/25/73
INCLINATION- 27.434 DEG
APOAPSIS- 121185. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.H. REYNOLDSUSAF CAMBRIDGE RES LAB
BEDFORD, MA

PS - K. YATESUSAF CAMBRIDGE RES LAB
BEDFORD, MA

SPACECRAFT BRIEF DESCRIPTION

THE SATELLITE HAS AN OCTAGONAL CONFIGURATION, IS SPIN-STABILIZED, AND WAS PLACED IN A MODERATELY ELLIPTICAL EARTH ORBIT (ECCENTRICITY = 0.670) BY A TITAN 3C ON MAY 23, 1969. THE PURPOSE OF THE SATELLITE IS TO MONITOR X RAY, ELECTRON, AND PHOTON RADIATION ASSOCIATED WITH SOLAR ACTIVITY IN ORDER TO DEVELOP DATA HANDLING TECHNIQUES IN NEAR REAL-TIME FOR USE BY THE AIR WEATHER SERVICE FORECAST CENTER IN FORECASTING SOLAR FLARES. MUCH USEFUL DATA HAS BEEN PRODUCED BY THE SPACECRAFT EXPERIMENTS.

----- OSO-6, YATES -----

EXPERIMENT NAME- GEIGER-MUELLER TUBE, SOLAR X-RAY DETECTOR, 2 TO 12 Å

NSSDC ID- 69-0468-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 05/23/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K. YATESUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

TWO IDENTICAL GEIGER-MUELLER TUBES (EON 6213) WERE MOUNTED IN MUTUALLY ORTHOGONAL POSITIONS AT 45 DEG AND 135 DEG WITH RESPECT TO THE SPACECRAFT SPIN AXIS. THESE DETECTORS, WHICH HAVE MICA WINDOWS, MEASURED THE SOLAR X-RAY FLUX IN THE 2- TO 12-Å BAND. THIS EXPERIMENT HAD AN END-OF-LIFE TIMER SET TO TERMINATE OPERATION IN MID 1970, HOWEVER THIS MECHANISM DID NOT ACTIVATE AS SCHEDULED.

----- OSO-6, YATES -----

EXPERIMENT NAME- SODIUM IODIDE SCINTILLATOR, GAMMA-RAY DETECTOR, 19 TO 1175 KEV

NSSDC ID- 69-0468-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 05/23/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K. YATESUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS EXPERIMENT WAS TO MONITOR SOLAR RADIATION FLUX IN FOUR BANDS RANGING FROM HARD X RAYS TO HARD GAMMA RAYS. A DETECTOR CONSISTING OF A SODIUM IODIDE CRYSTAL PHOTOMULTIPLIER (DOPPED WITH THALLIUM) WAS USED TO MEASURE SOLAR ELECTROMAGNETIC RADIATION IN THE 19- TO 76-KEV, 76- TO 232-KEV, 232- TO 1175-KEV, AND GREATER THAN 1175 KEV BANDS. THE SODIUM IODIDE CRYSTAL IS 0.5 IN. IN DIAMETER AND 0.5 IN. LONG, AND WAS CONTAINED IN A HERMETICALLY-SEALED ALUMINUM CAN WITH WALLS 0.010 IN. THICK. THE THICKNESS OF THE WALLS DETERMINED THE LOWER LIMIT OF THE DETECTOR'S SENSITIVITY. THE DETECTOR HAD AN AUTOMATIC END-OF-LIFE TIME? SET TO TERMINATE OPERATION IN MID-1970, HOWEVER, THIS MECHANISM DID NOT ACTIVATE AS SCHEDULED.

----- OSO-6, YATES -----

EXPERIMENT NAME- PROTON ALPHA PARTICLE TELESCOPE

NSSDC ID- 69-0468-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 08/12/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K. YATESUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS TELESCOPE CONSISTS OF TWO TOTALLY DEPLETED SILICON SURFACE BARRIER DETECTORS. THE INSTRUMENT LOOKS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. PROTONS IN THE ENERGY RANGES 5.3-8, 8-17, 17-40, AND 40-100 MEV AND ALPHA PARTICLES IN THE ENERGY RANGES 20-32, 32-68, AND 68-100 MEV ARE MEASURED SEPARATELY. THE SATELLITE ROTATES A SIGNIFICANT AMOUNT DURING EACH COUNTING INTERVAL.

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

----- OV5-6, YATES -----

EXPERIMENT NAME- LOW-ENERGY ELECTRON DETECTOR

NSSDC ID- 65-1050-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A STANDARD DATA ACQUISITION RATE SINCE 05/23/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - K. YATESUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION
A PLASTIC SCINTILLATOR DETECTOR MEASURES THE
OMNIDIRECTIONAL FLUXES OF ELECTRONS WITH ENERGIES GREATER THAN
40 KEV. THE DETECTOR HAS WORKED WELL FROM LAUNCH TO THE
PRESENT.

***** PIONEER 6 *****

SPACECRAFT COMMON NAME- PIONEER 6
ALTERNATE NAMES- PIONEER-A, 01841
NSSDC ID- 65-105A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/07/71.

LAUNCH DATE- 12/16/65 SPACECRAFT WEIGHT- 146. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC EPOCH DATE- 12/16/65
ORBIT PERIOD- 311.3 DAYS INCLINATION- .1639 DEG
PERIAPSIS- .0143 AU RAD APOAPSIS- .936 AU RAD

RECENT ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC EPOCH DATE- 12/16/65
ORBIT PERIOD- 311.3 DAYS INCLINATION- .1639 DEG
PERIAPSIS- .0143 AU RAD APOAPSIS- .936 AU RAD

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALLNASA-ARC
HOFFETT FIELD, CA
PS - J.H. WOLFENASA-ARC
HOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION
PIONEER 6 WAS THE FIRST IN A SERIES OF SOLAR-ORBITING,
SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES
DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA
FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS.
ITS EXPERIMENTS STUDIED THE POSITIVE IONS AND ELECTRONS IN THE
SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO
PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, AND
THE INTERPLANETARY MAGNETIC FIELD. ITS MAIN ANTENNA WAS A
HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS
SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS
PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED TOWARD THE
SOUTH ECLIPTIC POLE. BY GROUND COMMAND, ONE OF FIVE BIT RATES,
ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES
COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16,
AND 8 BPS. THREE OF THE FIVE DATA FORMATS CONTAINED PRIMARILY
SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER
FRAME. ONE SCIENTIFIC DATA FORMAT WAS FOR USE AT THE TWO
HIGHEST BIT RATES. ANOTHER WAS FOR USE AT THE THREE LOWEST BIT
RATES. THE THIRD CONTAINED DATA FROM ONLY THE RADIO
PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED
MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE REAL
TIME, TELEMETRY STORE, DUTY CYCLE STORE, AND MEMORY READOUT.
IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED
DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND
BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE
STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE
BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE
FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF
512 BPS. THE TIME INTERVAL BETWEEN THE COLLECTION AND STORAGE
OF SUCCESSIVE FRAMES COULD BE VARIED BY GROUND COMMAND BETWEEN
2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP
TO 19 HR. AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE
MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE
WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE
BIT RATE WAS 512 BPS FROM DECEMBER 16, 1965, TO FEBRUARY 20,
1966, 256 BPS FROM MARCH 1, 1966, TO MARCH 17, 1966, 64 BPS
FROM MARCH 18, 1966, TO APRIL 13, 1966, AND 16 OR 8 BPS FOR
ALL SUBSEQUENT PERIODS. THE REAL-TIME TRANSMISSION MODE WAS
USED PREDOMINANTLY THROUGHOUT THE FLIGHT WHEN TRACKING
STATIONS WERE AVAILABLE. BETWEEN TRACKING PERIODS, THE DUTY
CYCLE STORE MODE WAS GENERALLY USED. DATA COVERAGE AMOUNTED TO
ALMOST 100 PERCENT FOR THE FIRST 23 WEEKS AFTER LAUNCH. THEN
THE COVERAGE DROPPED TO BETWEEN 10 AND 20 PERCENT UNTIL
NOVEMBER, 1969 AT WHICH TIME THE DATA COVERAGE ROSE TO BETWEEN
20 AND 60 PERCENT. THERE HAS BEEN ALMOST NO TRACKING SINCE
JULY, 1972. A LEAK IN THE ATTITUDE GAS SYSTEM PREVENTED
FURTHER ATTITUDE CORRECTIONS FOLLOWING AN ADJUSTMENT MADE ON
JUNE 9, 1966. HOWEVER, THE SENSORS THAT DETERMINED THE SPIN
AXIS DIRECTION CONTINUED TO WORK AND INDICATED THAT THE SPIN
AXIS DIRECTION REMAINED CLOSE TO NOMINAL DURING THE MAJOR
PERIODS OF DATA ACQUISITION.

----- PIONEER 6, BRIDGE -----

EXPERIMENT NAME- SOLAR WIND PLASMA PARADAY CUP

NSSDC ID- 65-105A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/07/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - H.S. BRIDGEMASS INST OF TECH
CAMBRIDGE, MA
DI - A.J. LAZARUSMASS INST OF TECH
CAMBRIDGE, MA
DI - F. SCHEROMASS INST OF TECH
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION
A MULTIGRID PARADAY CUP WITH TWO SEMICIRCULAR, COPLANAR
COLLECTORS WAS USED TO STUDY SOLAR WIND IONS AND ELECTRONS.
THE INSTRUMENT HAD 14 CONTIGUOUS ENERGY-PER-CHARGE (E/Q)
CHANNELS BETWEEN 75 AND 9485 V FOR POSITIVE IONS AND FOUR
ENERGY-PER-CHARGE CHANNELS BETWEEN 90 AND 1500 V FOR
ELECTRONS. THE INSTRUMENT VIEW AXIS WAS PERPENDICULAR TO THE
SPACECRAFT SPIN AXIS AND PARALLEL TO THE ECLIPTIC PLANE. THE
LINE SEPARATING THE TWO COLLECTORS LAY IN THE ECLIPTIC PLANE,
ENVELOPING A ROUGH DETERMINATION OF SOLAR WIND BULK FLOW
PERPENDICULAR TO THE ECLIPTIC PLANE. DURING EVERY SECOND
SPACECRAFT ROTATION AND AT ONE VOLTAGE LEVEL, THE SUM OF THE
CURRENTS FROM THE COLLECTORS WAS OBTAINED IN 28 CONTIGUOUS
11.25-DEG ANGULAR SECTORS (FROM -45 DEG TO 270 DEG, WITH 0 DEG
BEING THE SPACECRAFT-SUN LINE). THE EIGHT MEASUREMENTS ABOUT
THE SUN-EARTH LINE (-45 DEG TO +45 DEG) WERE TELEMETERED, BUT
ONLY THE LARGEST MEASUREMENT IN EACH SUCCEEDING 45-DEG
INTERVAL (45 DEG TO 270 DEG) WAS TELEMETERED. IN ADDITION,
DURING THIS ROTATION, THE CURRENT FROM ONE OF THE COLLECTORS
WAS MEASURED IN ALL TWENTY-EIGHT 11.25-DEG SECTORS, AND THE
LARGEST WAS IDENTIFIED AND TELEMETERED (108TH MAGNITUDE AND ONE
SECTOR). A COMPLETE SET OF POSITIVE ION MEASUREMENTS AND ONE
ENERGY CHANNEL OF ELECTRON MEASUREMENTS WERE COMPLETED EVERY
32 SEC. THE TIME BETWEEN EACH 32-SEC GROUP OF MEASUREMENTS
VARIED WITH THE BIT RATE. FOR A MORE COMPLETE DESCRIPTION, SEE
J. GEOPHYS. RES., 71, 3787-3791, AUGUST 1966.

----- PIONEER 6, ESHLEMAN -----

EXPERIMENT NAME- TWO-FREQUENCY RADIO RECEIVER

NSSDC ID- 65-105A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/07/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - V.R. ESHLEMANSTANFORD U
STANFORD, CA
DI - T.A. CROFTSTANFORD U
STANFORD, CA
DI - R.L. LEADARRANDSTANFORD RES INST
MENLO PARK, CA
DI - D.K. GARRIDTSTANFORD U
STANFORD, CA
DI - A.W. PETERSONSTANFORD U
STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION
BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS
WERE TRANSMITTED FROM A 45-M STEERABLE PARABOLIC ANTENNA AT
STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE
SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE
SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY
LENGTHENED BY ELECTRONS ALONG THE PATH. THE LOW-FREQUENCY
SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT
IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED
RECEIVER COUNTER THE BEAT FREQUENCY ZERO CROSSINGS OF THE
RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH
DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO
OBSERVED, AND THESE VALUES WERE TELEMETERED TO THE GROUND
STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES, THE
IONOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM
OTHER EXPERIMENTAL TECHNIQUES) COULD BE SUBTRACTED TO PRODUCE
DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE
SOLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS
COVERING OTHER TIME PERIODS SEE 65-105A-03, 65-123A-03,
66-079A-04, AND 67-060A-02. A MORE DETAILED DESCRIPTION OF THE
EXPERIMENT CAN BE FOUND IN JOURNAL OF GEOPHYSICAL RESEARCH,
VOL. 71, P. 3325-3327, AND IN RADIO SCIENCE, VOL. 6, P. 55-63.

----- PIONEER 6, FAN -----

EXPERIMENT NAME- COSMIC-RAY TELESCOPE

NSSDC ID- 65-105A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 07/30/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.Y. FANU OF CHICAGO
TUCSON, AZ
DI - J.A. SIMPSONU OF CHICAGO
CHICAGO, IL
DI - J.F. LAMPORTU OF CHICAGO
CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT USED A CHARGED PARTICLE TELESCOPE COMPOSED OF FOUR SILICON SOLID-STATE DETECTORS TO STUDY THE ANISOTROPY AND FLUCTUATIONS OF SOLAR PROTONS AND ALPHA PARTICLES. THE PROTON ENERGY RANGES SAMPLED WERE 0.6 TO 13.9 MEV, 13.9 TO 73.2 MEV, 73.2 TO 175 MEV, AND 175 MEV (CORRESPONDING TO DETECTOR COINCIDENCES 01N0203N04, 0102N03N04, 0102N03N04, AND N0203N04). THE ALPHA PARTICLE ENERGY RANGES SAMPLED WERE 2.4 TO 55.6 MEV, 55.6 TO 293 MEV, AND 293 MEV (CORRESPONDING TO THE FIRST THREE DETECTOR COINCIDENCES GIVEN ABOVE). THE TIME RESOLUTION RANGED FROM ABOUT ONE MEASUREMENT PER 0.4 SEC TO ABOUT ONE MEASUREMENT PER 20 SEC DEPENDING ON THE TELEMETRY BIT RATE. THE DETECTOR WAS MOUNTED SO THAT IT MADE A 360-DEG SCAN IN THE ECLIPTIC PLANE ABOUT ONCE PER SECOND. PULSE HEIGHT ANALYSIS OF DETECTOR 01 OUTPUT (120 CHANNEL) AND 03 OUTPUT (32 CHANNEL) WAS ACCOMPLISHED FOR THE LAST EVENT PRIOR TO EACH TELEMETRY READOUT FOR THE EXPERIMENT. THE 03 DETECTOR FAILED ON OCTOBER 22, 1967. THE 04 DETECTOR PERFORMED INTERMITTENTLY UP TO LATE 1969.

----- PIONEER 6, MCCracken -----

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY

NSDCC ID- 65-105A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 07/30/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.G. MCCrackenU OF ADELAIDE
ADELAIDE, AUSTRALIA
OI - W.C. BARTLEYU OF TEXAS, DALLAS
DALLAS, TX
OI - U.R. RADPHYSICAL RESEARCH LAB
AHMEDABAD, INDIA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED PRIMARILY TO MEASURE THE DIRECTIONAL CHARACTERISTICS OF GALACTIC AND SOLAR COSMIC-RAY FLUXES. THE PARTICLE DETECTOR WAS A CSI (TL) SCINTILLATOR CRYSTAL THAT WAS SET INTO AN ANTICOINCIDENCE PLASTIC SCINTILLATOR COLLIMATOR CUP. SEPARATE PHOTOMULTIPLIER TUBES VIEWED THE TWO SCINTILLATORS. PULSES FROM THE CSI CRYSTAL UNACCOMPANIED BY PULSES FROM THE PLASTIC SCINTILLATOR WERE SORTED BY A THREE-WINDOW PULSE HEIGHT ANALYZER, THE WINDOWS CORRESPONDING TO ENERGY DEPOSITIONS OF 7.4 TO 44.0, 44.0 TO 77.1, AND 123.0 TO 303.8 MEV. COUNTS IN THE TWO LOWER ENERGY WINDOWS WERE DUE MAINLY TO PROTONS WITH THE WINDOW ENERGIES, WHILE ONLY PARTICLES OF Z GREATER THAN OR EQUAL TO 2 CONTRIBUTED TO THE HIGHEST ENERGY WINDOW COUNT RATE. (PROTONS ABOVE 90 MEV GAVE ANTICOINCIDENCE PULSES.) FOR EACH ENERGY WINDOW, COUNTS WERE SEPARATELY ACCUMULATED IN EACH OF FOUR ANGULAR SECTORS AS THE SPACECRAFT SPUN. EACH ANGULAR SECTOR WAS NORMALLY 09.5 DEG IN WIDTH, WITH THE SUN IN THE MIDDLE OF ONE SECTOR. HOWEVER, WHEN LARGE FLUXES WERE ENCOUNTERED, EACH ANGULAR SECTOR WAS REDUCED TO 11.2 DEG, WITH THE SUN NEAR THE MIDPOINT BETWEEN TWO SECTORS. A SPIN-INTEGRATED (ISOTROPIC) MODE, IN WHICH ALL PARTICLES DEPOSITING 7.4 MEV IN THE CSI CRYSTAL (NO ANTICOINCIDENCE REQUIREMENT) WERE COUNTED, WAS ALSO USED. ACCUMULATION TIMES FOR EACH OF THE 12 DIRECTIONAL MODES AND FOR THE OMNIDIRECTIONAL MODE VARIED BETWEEN 14 SEC AND 112 SEC (SPACECRAFT SPIN PERIOD WAS ABOUT 1 SEC) DEPENDING ON THE TELEMETRY BIT RATE. SEE THE SPACECRAFT BRIEF DESCRIPTION (65-105A) FOR INFORMATION ON PERCENT TIME COVERAGE VS TIME. SEE BARTLEY ET AL., REV. SCI. INSTRUM., 38, PAGE 266, 1967, FOR A MORE DETAILED EXPERIMENT DESCRIPTION.

***** PIONEER 7 *****

SPACECRAFT COMMON NAME- PIONEER 7

ALTERNATE NAMES- PIONEER-0, Q2390

NSDCC ID- 66-075A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/09/69.

LAUNCH DATE- 00/17/66 SPACECRAFT WEIGHT- 130. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS

INITIAL ORBIT PARAMETERS

ORBIT TYPE- HELIOCENTRIC EPOCH DATE- 08/17/66
ORBIT PERIOD- 402.9 DAYS INCLINATION- .09767 DEG
PERIAPSIS- 1.0100 AU RAD APOAPSIS- 1.1250 AU RAD

RECENT ORBIT PARAMETERS

ORBIT TYPE- HELIOCENTRIC EPOCH DATE- 08/17/66
ORBIT PERIOD- 402.9 DAYS INCLINATION- .09767 DEG
PERIAPSIS- 1.0100 AU RAD APOAPSIS- 1.1250 AU RAD

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALLNASA-ARC
HOFFETT FIELD, CA

PS - J.H. WOLFENASA-ARC
HOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

PIONEER 7 WAS THE SECOND IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA

FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, AND THE INTERPLANETARY MAGNETIC FIELD. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED APPROXIMATELY TOWARD THE SOUTH ECLIPTIC POLE. BY GROUND COMMAND, ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF 32 SEVEN-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED FOR THE TWO HIGHEST BIT RATES. ANOTHER WAS USED FOR THE THREE LOWEST BIT RATES. THE THIRD CONTAINED DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE (1) REAL TIME, (2) TELEMETRY STORE, (3) DUTY CYCLE STORE, AND (4) MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME PERIOD BETWEEN WHICH SUCCESSIVE FRAMES WERE COLLECTED AND STORED COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 19 HR, AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM AUGUST 17, 1966, TO OCTOBER 23, 1966, 256 BPS FROM OCTOBER 25, 1966, TO NOVEMBER 6, 1966, 64 BPS FROM NOVEMBER 9, 1966, TO DECEMBER 16, 1966, 16 BPS FROM DECEMBER 16, 1966, TO MAY 10, 1967, AND 8 BPS FROM MAY 10, 1967, AND THEREAFTER. HIGHER BIT RATES WERE POSSIBLE WHEN THE SPACECRAFT WAS BEING TRACKED BY THE 64-M ANTENNA, BUT THE DATA COVERAGE AT THESE TIMES WAS LOW. BY FEBRUARY 1968, ALL REAL-TIME DATA WERE BEING RECEIVED AT 8 BPS. DATA COVERAGE AVERAGED BETWEEN 50 AND 100 PERCENT COVERAGE FOR THE FIRST 30 WEEKS AFTER LAUNCH. THE DATA COVERAGE THEN FELL TO BETWEEN 20 AND 30 PERCENT UNTIL SEPTEMBER 1968. AFTER THIS TIME, IT DROPPED TO BETWEEN 0 AND 20 PERCENT THROUGH JANUARY 1971. ONLY AN INSIGNIFICANT AMOUNT OF DATA HAS BEEN OBTAINED SINCE JANUARY 1971. REAL-TIME TRANSMISSION WAS GENERALLY USED WHEN TRACKING STATIONS WERE AVAILABLE. OTHERWISE, THE DUTY CYCLE STORE MODE WAS USED. SOMETIME BETWEEN FEBRUARY 9, 1969, AND FEBRUARY 16, 1969, THE SUN SENSOR THAT GENERATED THE SPACECRAFT SUN PULSES FOR ONBOARD SECTORING OF EXPERIMENTS FAILED. HOWEVER, THE REMAINING SUN SENSORS CONTINUED TO FUNCTION, THUS PERMITTING DETERMINATION OF THE SPIN AXIS DIRECTION UNTIL ABOUT JANUARY 1972.

----- PIONEER 7, MCCracken -----

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY

NSDCC ID- 66-075A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/01/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.G. MCCrackenU OF ADELAIDE
ADELAIDE, AUSTRALIA
OI - W.C. BARTLEYU OF TEXAS, DALLAS
DALLAS, TX
OI - U.R. RADPHYSICAL RESEARCH LAB
AHMEDABAD, INDIA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED PRIMARILY TO MEASURE THE DIRECTIONAL CHARACTERISTICS OF GALACTIC AND SOLAR COSMIC RAY FLUXES. THE PARTICLE DETECTOR WAS A CSI (TL) SCINTILLATOR CRYSTAL THAT WAS SET INTO AN ANTICOINCIDENCE PLASTIC SCINTILLATOR COLLIMATOR CUP. SEPARATE PHOTOMULTIPLIER TUBES VIEWED THE TWO SCINTILLATORS. PULSES FROM THE CSI CRYSTAL THAT WERE NOT ACCOMPANIED BY PULSES FROM THE PLASTIC SCINTILLATOR WERE SORTED BY A THREE-WINDOW PULSE HEIGHT ANALYZER, THE WINDOWS CORRESPONDING TO ENERGY DEPOSITIONS OF 7.2 TO 47.4, 47.4 TO 64.5, AND 64.5 TO 01.2 MEV. NO POSITIVE SPECIES IDENTIFICATION WAS MADE ALTHOUGH MOST OF THE COUNTS IN EACH WINDOW WERE USUALLY DUE TO PROTONS WITH THE WINDOW ENERGIES. FOR EACH ENERGY WINDOW, COUNTS WERE SEPARATELY ACCUMULATED IN EACH OF FOUR ANGULAR SECTORS AS THE SPACECRAFT SPUN. EACH ANGULAR SECTOR WAS NORMALLY 09.5 DEG IN WIDTH, WITH THE SUN EITHER NEAR A SECTOR BOUNDARY OR IN THE MIDDLE OF A SECTOR, DEPENDING ON THE OPERATING MODE. HOWEVER, WHEN LARGE FLUXES WERE ENCOUNTERED, EACH ANGULAR SECTOR WAS REDUCED TO 11.2 DEG, WITH THE SUN EITHER IN A SECTOR OR NEAR THE MIDPOINT BETWEEN TWO SECTORS. A SPIN-INTEGRATED (ISOTROPIC) MODE, IN WHICH ALL PARTICLES DEPOSITING 7.2 MEV IN THE CSI CRYSTAL (NO ANTICOINCIDENCE REQUIREMENT) WERE COUNTED, WAS ALSO USED. ACCUMULATION TIMES FOR EACH OF THE 12 DIRECTIONAL MODES AND FOR THE OMNIDIRECTIONAL MODE VARIED BETWEEN 14 AND 112 SEC (SPACECRAFT SPIN PERIOD WAS ABOUT 1 SEC) DEPENDING ON THE TELEMETRY BIT RATE. DIRECTIONAL FLUX DATA RELIABILITY WAS REDUCED BY THE MALFUNCTION OF THE SUN PULSE MECHANISM BETWEEN FEBRUARY 9 AND FEBRUARY 16, 1969. OTHERWISE, THE INSTRUMENT FUNCTIONED NORMALLY, OBTAINING USEFUL OMNIDIRECTIONAL DATA. SEE THE SPACECRAFT BRIEF DESCRIPTION (66-075A) FOR INFORMATION ON PERCENT TIME COVERAGE VS TIME. SEE BARTLEY ET AL., REV. SCI. INSTRUM., 38, PAGE 266, 1967, FOR A MORE DETAILED

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

EXPERIMENT DESCRIPTION.

----- PIONEER 7, SIMPSON -----

EXPERIMENT NAME- COSMIC-RAY TELESCOPE

NSSDC ID- 66-075A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/01/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.A. SIMPSONU OF CHICAGO
CHICAGO, IL

OI - C.V. FANU OF ARIZONA
TUCSON, AZ

OI - J.E. LAMPOR.U OF CHICAGO
CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT USED A CHARGED PARTICLE TELESCOPE COMPOSED OF FOUR SILICON SOLID-STATE DETECTORS TO STUDY THE ANISOTROPY AND FLUCTUATIONS OF SOLAR PROTONS AND ALPHA PARTICLES. THE PROTON ENERGY RANGES SAMPLED WERE 0.6 TO 12. MEV, 12.7 TO 73.0 MEV, 73.0 TO 165 MEV, AND 165 TO 280 MEV (CORRESPONDING TO DETECTOR COINCIDENCES 0102N0T04, 0102N0T04, 0102N0T04, AND 0102N0T04). THE ALPHA PARTICLE ENERGY RANGES SAMPLED WERE 2.5 TO 52 MEV, 52 TO 200 MEV, AND 200 MEV (CORRESPONDING TO THE FIRST THREE DETECTOR COINCIDENCES). THE TIME RESOLUTION RANGED FROM ABOUT ONE MEASUREMENT PER 0.4 SEC TO ABOUT ONE MEASUREMENT PER 28 SEC DEPENDING ON THE TELEMETRY BIT RATE. THE DETECTOR WAS MOUNTED TO MAKE A 360-DEG SCAN IN THE ECLIPTIC PLANE ABOUT ONCE PER SECOND. THE D3 DETECTOR FAILED ON MAY 26, 1969.

----- PIONEER 7, WOLFE -----

EXPERIMENT NAME- ELECTROSTATIC ANALYZER

NSSDC ID- 66-075A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/16/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. WOLFENASA-ARC
MOFFETT FIELD, CA

OI - R.W. SILVANASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION
A QUADRISPHERICAL ELECTROSTATIC ANALYZER WITH EIGHT CONTIGUOUS CURRENT COLLECTORS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF THE ELECTRONS AND POSITIVE IONS IN THE SOLAR WIND. IONS WERE DETECTED IN 16 LOGARITHMICALLY EQUISPACED ENERGY PER UNIT CHARGE (E/Q) STEPS FROM 200 TO 10,000 V. THERE WAS AN ELECTRON MODE OF OPERATION IN WHICH ELECTRONS WERE MEASURED IN EIGHT LOGARITHMICALLY EQUISPACED ENERGY PER CHARGE STEPS RANGING FROM 0 TO 500 V. THE EIGHT COLLECTORS MEASURED PARTICLES INCIDENT FROM EIGHT DIFFERENT CONTIGUOUS ANGULAR INTERVALS RELATIVE TO THE SPACECRAFT EQUATORIAL PLANE (SAME AS THE ECLIPTIC PLANE). THERE WERE FOUR 15-DEG INTERVALS, TWO 20-DEG INTERVALS, AND TWO 30-DEG INTERVALS. AS THE SPACECRAFT WAS SPINNING, FLUXES WERE MEASURED IN 15 AZIMUTHAL ANGULAR SECTORS. EIGHT OF THESE SECTORS WERE 5-5/8 DEG WIDE, WERE CONTIGUOUS, AND BRACKETED THE SOLAR DIRECTION. THE REMAINING SEVEN SECTORS WERE 45 DEG WIDE. THREE DIFFERENT MODES OF DATA COLLECTION WERE USED. AT THE HIGHEST BIT RATE (512 BPS), THE FULL SCAN MODE WAS ALTERNATED WITH THE MAXIMUM FLUX MODE AT EACH E/Q STEP. IN THE FULL SCAN MODE, THE MAXIMUM FLUX OBSERVED IN EACH OF THE 15 AZIMUTHAL SECTORS AS THE SPACECRAFT ROTATED WAS RECORDED FOR A GIVEN SINGLE COLLECTOR AT A GIVEN E/Q STEP. DURING 24 SUCCESSIVE OPERATIONS OF THE FULL SCAN MODE (48 SPACECRAFT REVOLUTIONS), THE 16 ION E/Q STEPS AND EIGHT ELECTRON E/Q STEPS WERE EXERCISED FOR A GIVEN COLLECTOR. DURING EIGHT STEPS WERE EXERCISED EACH PERIOD, EACH OF THE EIGHT COLLECTORS WAS EXERCISED. THE FULL CYCLE OF FULL SCAN MODE DATA REQUIRED 400 SPACECRAFT REVOLUTIONS (ABOUT 400 SEC). SUCH CYCLES WERE REPEATED WITHOUT INTERRUPTION AT THE HIGH BIT RATE. IN THE MAXIMUM FLUX MODE, FOR THE E/Q STEP USED IN THE PRECEDING REVOLUTION OF FULL SCAN MODE OPERATION, ALL COLLECTORS WERE OBSERVED FOR ONE REVOLUTION, AND THE MAXIMUM FLUX OBSERVED WAS REPORTED ALONG WITH THE NUMBER OF THE COLLECTOR THAT OBSERVED IT AND THE ANGULAR DIRECTION (2-13/16-DEG RESOLUTION) OF THE OBSERVATION. AT THE NEXT HIGHEST BIT RATE (256 BPS), THE SHORT SCAN MODE WAS ALTERNATED EVERY SPACECRAFT REVOLUTION WITH THE MAXIMUM FLUX MODE. THE SHORT SCAN MODE WAS THE SAME AS THE FULL SCAN EXCEPT THAT ONLY THE PEAK FLUX IN EACH OF THE EIGHT 5-5/8-DEG-WIDE AZIMUTHAL SECTORS WAS RECORDED. THUS, THIS CYCLE ALSO TOOK 400 SPACECRAFT REVOLUTIONS. AT THE LOW BIT RATES (64, 16, AND 8 BPS), THE MAXIMUM FLUX MODE ALONE WAS USED. THUS, NO AZIMUTHAL DISTRIBUTIONS WERE MEASURED. AT THE LOW BIT RATES, IT TOOK 32 SEC FOR A COMPLETE SET OF ION MEASUREMENTS AND 16 SEC FOR A COMPLETE SET OF ELECTRON MEASUREMENTS. AT 64 BPS, THE ION AND ELECTRON MEASUREMENTS WERE TAKEN AND TELEMETERED EVERY 8 SEC. AT 16 BPS, THEY WERE TAKEN AND TELEMETERED EVERY 32 SEC. AT 8 BPS, THEY WERE TAKEN AND TELEMETERED EVERY 64 SEC.

***** PIONEER 8 *****

SPACECRAFT COMMON NAME- PIONEER 8
ALTERNATE NAMES- PIONEER-C, D3066
NSSDC ID- 67-123A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/02/71.

LAUNCH DATE- 12/13/67 SPACECRAFT WEIGHT- 146. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC EPOCH DATE- 12/13/67
ORBIT PERIOD- 386.6 DAYS INCLINATION- .0378 DEG
PERIAPSIS- .9692 AU RAD APDAPSIS- 1.0880 AU RAD

RECENT ORBIT PARAMETERS
ORBIT TYPE- HELIOCENTRIC EPOCH DATE- 12/13/67
ORBIT PERIOD- 386.6 DAYS INCLINATION- .0378 DEG
PERIAPSIS- .9692 AU RAD APDAPSIS- 1.0880 AU RAD

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALLNASA-ARC
MOFFETT FIELD, CA

PS - J.H. WOLFENASA-ARC
MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION
PIONEER 8 WAS THE THIRD IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, SOLAR CELL, AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY THE POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, THE INTERPLANETARY MAGNETIC FIELD, COSMIC DUST, AND ELECTRIC FIELDS. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE BY GROUND COMMAND. ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF FOUR OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS WERE USED PRIMARILY FOR SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED AT THE TWO HIGHEST BIT RATES. ANOTHER WAS USED AT THE THREE LOWEST BIT RATES. THE THIRD WAS USED FOR DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT WAS USED MAINLY FOR ENGINEERING DATA. THE FOUR OPERATING MODES WERE (1) REAL TIME, (2) TELEMETRY STORE, (3) DUTY CYCLE STORE, AND (4) MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME INTERVAL BETWEEN THE COLLECTION AND STORAGE OF SUCCESSIVE FRAMES COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS UP TO 15 HRS AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM DECEMBER 13, 1967 TO MARCH 20, 1968, 256 BPS FROM MARCH 20, 1968 TO MAY 6, 1968, 64 BPS FROM MAY 6, 1968 TO AUGUST 29, 1968, AND 16 OR 8 BPS THEREAFTER. HIGHER BIT RATES WERE USED WHEN THE SPACECRAFT WAS TRACKED BY THE 64-M ANTENNA. BUT THE DATA COVERAGE BY THIS ANTENNA WAS LOW. DATA COVERAGE AVERAGED CLOSE TO 100 PERCENT FOR THE FIRST YEAR AFTER LAUNCH. AFTER THAT, THE DATA COVERAGE AVERAGED BETWEEN 50 AND 80 PERCENT UNTIL NOVEMBER 1970 WHEN COVERAGE DROPPED TO BETWEEN 50 AND 0 PERCENT. ALMOST NO DATA HAVE BEEN ACQUIRED SINCE MAY, 1971. DURING A REORIENTATION MANEUVER IN MARCH 1968, ONE OF THE FOUR SUN SENSORS (WHICH WAS CONNECTED TO THE ATTITUDE GAS SYSTEM USED TO KEEP THE SPIN AXIS POINTED) WAS FOUND TO BE INOPERATIVE. IT WAS NOTED AT THIS TIME THAT THE SPACECRAFT ATTITUDE WAS OFF 4 DEG. ANOTHER ORIENTATION WAS ATTEMPTED IN JUNE 1968, AND IT WAS FOUND THAT THREE OF THE FOUR ATTITUDE SUN SENSORS WERE INOPERATIVE.

----- PIONEER 8, BERG -----

EXPERIMENT NAME- COSMIC DUST DETECTOR

NSSDC ID- 67-123A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/25/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.E. BERGNASA-GSFC
GREENBELT, MD

OI - L. SECRETANNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO (1) MEASURE THE COSMIC DUST FLUX DENSITY IN THE SOLAR SYSTEM, (2) DETERMINE THE DISTRIBUTION OF COSMIC DUST CONCENTRATIONS IN THE EARTH'S

ORBIT, (3) DETERMINE THE GRADIENT, FLUX DENSITY, AND SPEED OF PARTICLES IN NEUTRON STREAMS, AND (4) PERFORM AN IN-FLIGHT CONTROL EXPERIMENT ON THE RELIABILITY OF THE MICROPHONE AS A COSMIC DUST SENSOR. THE EXPERIMENT INSTRUMENTATION, WHICH WAS MOUNTED IN THE EQUATOR OF THE SATELLITE WITH ITS AXIS RADIAL TO THE SATELLITE SPIN AXIS LACING IN THE ECLIPTIC PLANE, CONSISTED OF A FRONT FILM-GRID SENSOR ARRAY AND A REAR FILM-GRID SENSOR ARRAY, SPACED FIVE CM APART, AND AN ACOUSTICAL IMPACT PLATE UPON WHICH THE REAR FILM WAS MOUNTED. THE SENSOR ARRAYS CONSISTED OF FOUR VERTICAL FILM STRIPS CROSSED BY FOUR HORIZONTAL GRID STRIPS TO FORM 16 FRONT AND 16 REAR FILM-GRID ARRAYS (EACH 2.5 CM SQ), CREATING 256 POSSIBLE COMBINATIONS. EACH GRID STRIP AND FILM STRIP WAS CONNECTED TO A SEPARATE OUTPUT AMPLIFIER WHOSE SIGNALS WERE USED TO DETERMINE THE SEGMENT IN WHICH AN IMPACT OCCURRED. THE FRONT FILM SENSOR, WHICH WAS RECESSED THREE CM INTO THE EXPERIMENT HOUSING, CONSISTED OF AN 8-LAYER COMPOSITE -- 700-A PARYLENE ENCAPSULATION, 500-A COPPER, 300-A ALUMINUM, 3000-A PARYLENE SUBSTRATE, 300-A ALUMINUM, 500-A COPPER, SUPPORT MESH, AND 500-A PARYLENE ENCAPSULATION. EACH OF THE REAR SENSOR-ARRAY FILM STRIPS CONSISTED OF A 60-MICRON MOLYBDENUM SHEET CEMENTED TO A QUARTZ ACOUSTICAL SENSOR PLATE. THE OPERATION OF THE SENSORS WAS BASED ON TWO BASIC MEASURABLE PHENOMENA THAT OCCUR WHEN A HYPERVELOCITY PARTICLE IMPACTS ON A SURFACE -- (1) FORMATION OF PLASMA AND (2) TRANSFER OF MOMENTUM. WHEN THE FRONT FILM WAS PENETRATED BY A PARTICLE, A TIME-OF-FLIGHT 4-MHZ ELECTRONIC CLOCK WAS ACTIVATED. THE CLOCK WAS SHUT OFF WHEN THE PARTICLE IMPACTED ON THE REAR FILM THUS MEASURING PARTICLE SPEED AND DIRECTION. THREE GENERAL COSMIC DUST PARTICLE TYPES WERE DETECTABLE -- (1) HIGH-ENERGY, HYPERVELOCITY PARTICLES (GREATER THAN 1 ERG), WHICH PRODUCED RESPONSES AT BOTH FRONT AND REAR FILM SENSORS, (2) LOW-ENERGY, HYPERVELOCITY PARTICLES (LESS THAN 1 ERG), WHICH PRODUCED RESPONSES ONLY AT THE FRONT FILM SENSOR, AND (3) RELATIVELY LARGE HIGH-VELOCITY PARTICLES (GREATER THAN 0.1 NANOGRAMS) WHICH COULD PASS THROUGH THE FRONT AND REAR FILM SENSOR ARRAYS WITHOUT GENERATING A DETECTABLE PLASMA BUT COULD STILL IMPART A MEASURABLE IMPULSE TO THE ACOUSTICAL SENSOR. THE ACOUSTICAL SENSORS WERE DESIGNED TO PERFORM AN IN-FLIGHT STUDY ON THE RELIABILITY OF THE MICROPHONE AS A COSMIC DUST SENSOR IN ADDITION TO PERFORMING AS AN IMPACT SENSOR FOR THIS EXPERIMENT. IN-FLIGHT CALIBRATION WAS INITIATED BY GROUND COMMAND, WHICH MONITORED THE EXPERIMENT ELECTRONICS IN ADDITION TO PROVIDING A CHECK ON THE PHYSICAL CONDITION OF THE PLASMA SENSORS. THE SENSORS WERE CALIBRATED PRIOR TO THE FLIGHT BY IMPACTS WITH IRON SPHERES RANGING IN MASS FROM 1 MICROGRAM TO 0.1 MICROGRAM, ACCELERATED BY A 2-MV ELECTROSTATIC ACCELERATOR TO 2 TO 10 KM/SEC. THE MASSES, DENSITIES, AND SPEEDS, HOWEVER, WERE TOO NARROW IN RANGE TO PROVIDE ANY COMPREHENSIVE CALIBRATION WHEN USING REAL DATA.

----- PIONEER 8, ESHLEMAN -----

EXPERIMENT NAME- TWO-FREQUENCY DEACON RECEIVER

NSSDC ID- 67-123A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/25/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - V.R. ESHLEMANSTANFORD U
STANFORD, CA
OI - T.A. CROFTSTANFORD U
STANFORD, CA
OI - M.T. HOWARDSTANFORD U
STANFORD, CA
OI - R.L. LEONARDSTANFORD RES INST
MENLO PARK, CA
OI - R.A. LONGSTANFORD RES INST
MENLO PARK, CA
OI - A.H. PETERSONSTANFORD U
STANFORD, CA
OI - F.L. SCARFTRW SYSTEMS GROUP
REDONDR BEACH, CA

EXPERIMENT BRIEF DESCRIPTION

BOTH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 46-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY DELAYED. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCE. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED, AND THESE VALUES WERE TELEMETERED TO THE GROUND STATION. FROM CALCULATED TOTAL ELECTRON CONTENT VALUES, THE IONOSPHERIC EFFECT (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD BE SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS COVERING OTHER TIME PERIODS, SEE 68-100A-03, 66-075A-04, 65-105A-04, AND 67-060A-02. A MORE DETAILED DESCRIPTION OF THE EXPERIMENT CAN BE FOUND IN JOURNAL OF GEOPHYSICAL RESEARCH, VOL 17, PP 3329-3327, AND IN RADIO SCIENCE, VOL 6, PP 55-63.

----- PIONEER 8, MCCracken -----

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY

NSSDC ID- 67-123A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 06/02/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - K.G. MCCrackenU OF ADELAIDE
ADELAIDE, AUSTRALIA
OI - U.R. RADPHYSICAL RESEARCH LAB
AHMADACED, INDIA
OI - W.C. BARTLEYU OF TEXAS, DALLAS
DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A CSI SCINTILLATOR AND THREE SOLID-STATE TELESCOPES. THE CSI SCINTILLATOR WAS COLLIMATED BY AN ANTICOINCIDENCE PLASTIC SCINTILLATOR AND HAD A CONICAL APERTURE WITH A 38.2-DEG HALF-ANGLE. THE SCINTILLATOR LOOK DIRECTION WAS CENTERED IN THE ECLIPTIC PLANE. THREE SOLID-STATE DETECTORS WERE ORIENTED IN A FAN ARRANGEMENT WITH RESPECT TO A FOURTH SOLID-STATE DETECTOR, SUCH THAT EACH OF THE FIRST THREE DETECTORS FORMED A TELESCOPE WITH THE FOURTH DETECTOR. EACH OF THE THREE TELESCOPES THUS FORMED HAD AN ACCEPTANCE CONE OF 23-DEG HALF ANGLE. THE MEAN VIEWING DIRECTIONS OF THE TELESCOPES WERE IN THE ECLIPTIC PLANE AND 48 DEG ABOVE AND BELOW THAT PLANE, RESPECTIVELY. TWO CONCURRENT NODES OF COUNTING WERE EMPLOYED. IN THE FIRST NODE, COUNTS WERE ACCUMULATED IN EIGHT SEPARATE 45-DEG INTERVALS DURING THE SPACECRAFT SPIN, WHILE, IN THE SECOND, THE SPIN-INTEGRATED COUNTS WERE ACQUIRED. IN THE FIRST NODE, THE SCINTILLATOR SEPARATELY MEASURED PARTICLES WITH ENERGIES IN THE RANGES 7.4 TO 21.5 MEV/NUCLEON AND 19.7 TO 63.0 MEV/NUCLEON (NO SPECIES DISCRIMINATION) WHILE EACH SOLID-STATE TELESCOPE SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES 3.3 TO 3.6 MEV AND 3.6 TO 6.7 MEV. IN THE SECOND NODE, THE SCINTILLATOR SEPARATELY MEASURED PARTICLES IN SIX CONTIGUOUS ENERGY INTERVALS BETWEEN 4.5 AND 40 MEV/NUCLEON (INTERVAL LOWER LIMITS AT 4.7, 7.0, 9.6, 13, 21, AND 28 MEV/NUCLEON), WHILE EACH OF THE SOLID-STATE TELESCOPES SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES 1 TO 5, 1 TO 3, AND 4 TO 6 MEV AND ALPHA PARTICLES IN THE ENERGY RANGE 4 TO 8 MEV. DURING EACH 244-BIT MAIN TELEMETRY FRAME, TWO FIRST-NODE 9-BIT ACCUMULATORS AND ONE SECOND-NODE 9-BIT ACCUMULATOR WERE READ OUT. INFLIGHT CALIBRATION OF THE SCINTILLATOR AND OF SOME OF THE ELECTRONICS WAS PERFORMED DAILY. SEE BUKATA ET AL, 1966 TRANS. NUC. SCI., NS-17, 18-24, 1970, FOR A MORE DETAILED EXPERIMENT DESCRIPTION.

----- PIONEER 8, NESS -----

EXPERIMENT NAME- SINGLE-AXIS MAGNETOMETER

NSSDC ID- 67-123A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/02/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - N.F. NESSNASA-GSFC
GREENBELT, MD
OI - S.C. CANTARANOU OF ROME
ROME, ITALY
OI - F. MARIANIU OF AQUILA
AQUILA, ITALY

EXPERIMENT BRIEF DESCRIPTION

A SINGLE, GROUND-MOUNTED UNIAXIAL FLUXGATE MAGNETOMETER, WITH MODE-DEPENDENT RANGES OF PLUS OR MINUS 32 GAMMAS AND PLUS OR MINUS 96 GAMMAS AND CORRESPONDING RESOLUTIONS OF PLUS OR MINUS 0.125 GAMMA AND PLUS OR MINUS 0.375 GAMMA, OBTAINED A VECTOR MAGNETIC FIELD MEASUREMENT BY MEANS OF THREE MEASUREMENTS TAKEN AT EQUAL TIME INTERVALS DURING EACH SPACECRAFT SPIN PERIOD (APPROXIMATELY 1 SEC). AT TELEMETRY BIT RATES LESS THAN OR EQUAL TO 16 OPS, AVERAGES WERE COMPUTED ON BOARD FOR TRANSMISSION TO EARTH.

----- PIONEER 8, WEBBER -----

EXPERIMENT NAME- COSMIC-RAY GRADIENT DETECTOR

NSSDC ID- 67-123A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/02/71.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - W.R. WEBBERU OF NEW HAMPSHIRE
DURHAM, NH

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT UTILIZED A TELESCOPE COMPRISED OF FIVE SOLID-STATE SENSORS, A CERENKOV DETECTOR, AND AN ANTICOINCIDENCE SHIELD. THE TELESCOPE AXIS WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS, AS DETERMINED BY TWO COINCIDENCE MODES AND ELECTRONIC DISCRIMINATION OF SENSOR OUTPUT PULSES. PARTICLES MEASURED WERE ELECTRONS IN THREE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.38 AND 0.4 MEV, PROTONS IN SIX CONTIGUOUS ENERGY INTERVALS BETWEEN 3.49 AND 64.3 MEV (ONE OF FIVE COUNT RATES WAS DUE TO THE SUM OF COUNTS IN TWO NONCONTIGUOUS ENERGY INTERVALS), AND ALPHA PARTICLES IN FOUR CONTIGUOUS ENERGY INTERVALS BETWEEN 0.64 AND 0.41 MEV/NUCLEON (ONE OF THREE COUNT RATES WAS DUE TO THE SUM OF COUNTS IN TWO NONCONTIGUOUS ENERGY INTERVALS). A THIRD COINCIDENCE MODE MEASURED THE SUM OF COUNTS DUE TO ELECTRONS ABOVE 0.6 MEV AND NUCLEI ABOVE 14 MEV/NUCLEON. A FOURTH COINCIDENCE MODE MEASURED THE SUM OF NUCLEI ABOVE 42 MEV/NUCLEON AND ELECTRONS ABOVE 1.1 MEV.

SPACECRAFT SPIN-INTEGRATED DIRECTIONAL FLUXES WERE MEASURED IN THE VARIOUS MODES. ACCUMULATION TIMES AND READOUT INTERVALS WERE DEPENDENT ON THE TELEMETRY BIT RATE AND WERE TYPICALLY IN TENS OF SECONDS. IN ALL CASES, THEY WERE LONGER THAN THE SPACECRAFT SPIN PERIOD. THE EXPERIMENT FUNCTIONED WELL DURING THE SPACECRAFT LIFETIME, ALTHOUGH AT LOW TELEMETRY BIT RATES, ACCUMULATOR SATURATION RENDERED SOME COUNTING MODES TO BE OF NO VALUE. FOR FURTHER DETAILS, SEE J. GEOPHYS RES. VOL 75, P 1605, 1971.

----- PIONEER 9, WOLFE -----
 EXPERIMENT NAME- ELECTROSTATIC ANALYZER
 NSSDC ID- 67-123A-02
 LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
 AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/25/71.
 EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - J.H. WOLFENASA-ARC
 HOFFETT FIELD, CA
 DI - D.D. MCKIBBINNASA-ARC
 HOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION
 A TRUNCATED HEMISPHERICAL ELECTROSTATIC ANALYZER (120-DEG TOTAL PARALLEL PLATE CURVATURE) WITH THREE CONTIGUOUS CURRENT COLLECTORS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF THE ELECTRONS AND POSITIVE IONS IN THE SOLAR WIND. IONS WERE DETECTED IN 30 LOGARITHMICALLY EQUISPACED ENERGY PER UNIT CHARGE (E/Q) STEPS FROM 150 TO 15,000 V. THERE WAS AN ELECTRON MODE OF OPERATION IN WHICH ELECTRONS WERE MEASURED IN 14 LOGARITHMICALLY EQUISPACED E/Q STEPS RANGING FROM 12 TO 1000 V. THERE WAS ALSO A ZERO E/Q, OR BACKGROUND, STEP. IN OPERATION, THE ELECTRONS WERE MEASURED FIRST, THEN BACKGROUND, AND THEN THE IONS. THE THREE COLLECTORS MEASURED PARTICLES INCIDENT FROM THREE DIFFERENT CONTIGUOUS ANGULAR INTERVALS RELATIVE TO THE SPACECRAFT EQUATORIAL PLANE (SAME AS THE ECLIPTIC PLANE). TWO COLLECTORS MEASURED FLUX FROM 10 TO 85 DEG ON EITHER SIDE OF THE SPACECRAFT EQUATORIAL PLANE, AND THE THIRD MEASURED FLUX IN A 20-DEG INTERVAL CENTERED ON THE SPACECRAFT EQUATORIAL PLANE. AS THE SPACECRAFT WAS SPINNING, FLUXES WERE MEASURED IN 23 POSSIBLE 2-13/16-DEG-WIDE AZIMUTHAL ANGULAR SECTORS. SEVENTEEN OF THESE SECTORS WERE CONTIGUOUS AND ORACKETED THE SOLAR DIRECTION (AS DETERMINED BY REFERENCING THE NORMAL TO THE INSTRUMENT APERTURE TO THE SPACE SUN SENSOR PULSE). THE REMAINING SIX SECTORS WERE WIDELY SPACED. THE INSTRUMENT HAD THREE MODES OF DATA COLLECTION - POLAR SCAN, AZIMUTHAL SCAN, AND MAXIMUM FLUX. AT THE TWO HIGHEST BIT RATES (512 AND 256 BPS) THE POLAR SCAN MODE WAS ALTERNATED WITH THE AZIMUTHAL SCAN MODE AT EACH E/Q STEP. IN THE POLAR SCAN MODE, ALL THREE COLLECTORS WERE OBSERVED, AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPORTED FOR EACH COLLECTOR. IN THE AZIMUTHAL SCAN MODE, THE PEAK FLUX OBSERVED IN THE 23 AZIMUTHAL SECTORS WAS RECORDED FOR THE CENTRAL COLLECTOR AT EACH E/Q STEP. AT THE LOW BIT RATES (64, 16, AND 8 BPS), THE MAXIMUM FLUX MODE WAS USED AT EACH E/Q STEP FOLLOWED BY EITHER (1) FOR IONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT THAT E/Q STEP WHERE THE PEAK FLUX MEASUREMENT DURING THE MAXIMUM FLUX MODE WAS OBTAINED, OR (2) FOR ELECTRONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT E/Q = 100 V. IN THE MAXIMUM FLUX MODE, ONLY THE CENTRAL COLLECTOR WAS OBSERVED, AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPORTED. A COMPLETE SET OF MEASUREMENTS CONSISTED OF SEVEN SETS OF ION MEASUREMENTS (AT EACH E/Q STEP) AND ONE SET OF ELECTRON MEASUREMENTS (AT EACH E/Q STEP). AT THE HIGH BIT RATES (512 AND 256 BPS) ONE SET OF ION MEASUREMENTS TOOK 62 SEC AND ONE SET OF ELECTRON MEASUREMENTS 38 SEC. AT THE LOW BIT RATES (64, 16, AND 8 BPS), ONE SET OF ION MEASUREMENTS TOOK 37 SEC AND ONE SET OF ELECTRON MEASUREMENTS 20 SEC. AT 64 BPS, A COMPLETE SET OF MEASUREMENTS (SEVEN IONS PLUS ONE ELECTRON) WAS TAKEN AND TELEMETERED EVERY 402.5 SEC. AT 16 BPS, IT TOOK 1610 SEC AND AT 8 BPS, IT TOOK 3220 SEC.

***** PIONEER 9 *****
 SPACECRAFT COMMON NAME- PIONEER 9
 ALTERNATE NAMES- PIONEER-D, PL-504K
 03533
 NSSDC ID- 68-100A
 LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
 AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/19/69.
 LAUNCH DATE- 11/08/68 SPACECRAFT WEIGHT- 147. KG
 LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
 LAUNCH VEHICLE- DELTA
 SPONSORING COUNTRY/AGENCY
 UNITED STATES NASA-DSS
 INITIAL ORBIT PARAMETERS
 ORBIT TYPE- HELIOCENTRIC
 ORBIT PERIOD- 297.6 DAYS
 PERIAPSIS- 0.7542 AU RAD EPOCH DATE- 11/08/68
 INCLINATION- 0.06509 DEG
 APOAPSIS- 0.9905 AU RAD
 RECENT ORBIT PARAMETERS
 ORBIT TYPE- HELIOCENTRIC
 ORBIT PERIOD- 297.6 DAYS
 PERIAPSIS- 0.7542 AU RAD EPOCH DATE- 11/08/68
 INCLINATION- 0.06509 DEG
 APOAPSIS- 0.9905 AU RAD

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PM - C.F. HALLNASA-ARC
 HOFFETT FIELD, CA
 PS - J.H. WOLFENASA-ARC
 HOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION
 PIONEER 9 WAS THE FOURTH IN A SERIES OF SOLAR-ORBITING, SPIN-STABILIZED, AND SOLAR-CELL AND BATTERY-POWERED SATELLITES DESIGNED TO OBTAIN MEASUREMENTS OF INTERPLANETARY PHENOMENA FROM WIDELY SEPARATED POINTS IN SPACE ON A CONTINUING BASIS. THE SPACECRAFT CARRIED EXPERIMENTS TO STUDY THE POSITIVE IONS AND ELECTRONS IN THE SOLAR WIND, THE INTERPLANETARY ELECTRON DENSITY (RADIO PROPAGATION EXPERIMENT), SOLAR AND GALACTIC COSMIC RAYS, THE INTERPLANETARY MAGNETIC FIELD, COSMIC DUST, AND ELECTRIC FIELDS. ALSO, A NEW CODING PROCESS WAS IMPLEMENTED FOR PIONEER 9. ITS MAIN ANTENNA WAS A HIGH-GAIN DIRECTIONAL ANTENNA. THE SPACECRAFT WAS SPIN-STABILIZED AT ABOUT 60 RPM, AND THE SPIN AXIS WAS PERPENDICULAR TO THE ECLIPTIC PLANE AND POINTED TOWARD THE SOUTH ECLIPTIC POLE, BY GROUND COMMAND, ONE OF FIVE BIT RATES, ONE OF FOUR DATA FORMATS, AND ONE OF SEVEN OPERATING MODES COULD BE SELECTED. THE FIVE BIT RATES WERE 512, 256, 64, 16, AND 8 BPS. THREE OF THE FOUR DATA FORMATS CONTAINED PRIMARILY SCIENTIFIC DATA AND CONSISTED OF THIRTY-TWO 7-BIT WORDS PER FRAME. ONE SCIENTIFIC DATA FORMAT WAS USED AT THE TWO HIGHEST BIT RATES, ANOTHER WAS USED AT THE THREE LOWEST BIT RATES, AND THE THIRD CONTAINED DATA FROM ONLY THE RADIO PROPAGATION EXPERIMENT. THE FOURTH DATA FORMAT CONTAINED MAINLY ENGINEERING DATA. THE FOUR OPERATING MODES WERE REAL TIME, TELEMETRY STORE, DUTY CYCLE STORE, AND MEMORY READOUT. IN THE REAL-TIME MODE, DATA WERE SAMPLED AND TRANSMITTED DIRECTLY (WITHOUT STORAGE) AS SPECIFIED BY THE DATA FORMAT AND BIT RATE SELECTED. IN THE TELEMETRY STORE MODE, DATA WERE STORED AND TRANSMITTED SIMULTANEOUSLY IN THE FORMAT AND AT THE BIT RATE SELECTED. IN THE DUTY CYCLE STORE MODE, A SINGLE FRAME OF SCIENTIFIC DATA WAS COLLECTED AND STORED AT A RATE OF 512 BPS. THE TIME PERIOD BETWEEN WHICH SUCCESSIVE FRAMES WERE COLLECTED AND STORED COULD BE VARIED BY GROUND COMMAND BETWEEN 2 AND 17 MIN TO PROVIDE PARTIAL DATA COVERAGE FOR PERIODS OF UP TO 19 HR, AS LIMITED BY THE BIT STORAGE CAPACITY. IN THE MEMORY READOUT MODE, DATA WERE READ OUT AT WHATEVER BIT RATE WAS APPROPRIATE TO THE SATELLITE DISTANCE FROM THE EARTH. THE BIT RATE FOR THE MAJORITY OF THE DATA WAS 512 BPS FROM NOVEMBER 8, 1968, TO JANUARY 15, 1969, 256 BPS FROM JANUARY 16, 1969, TO JANUARY 29, 1969, 64 BPS FROM JANUARY 30, 1969 TO MARCH 27, 1969, AND 16 OR 8 BPS THEREAFTER. HIGHER BIT RATES WERE USED WHEN THE SPACECRAFT WAS TRACKED BY THE 64-CM ANTENNA, BUT THE DATA COVERAGE BY THIS ANTENNA WAS LOW. THE DATA COVERAGE AVERAGED CLOSE TO 100 PERCENT FOR THE FIRST 29 WEEKS AFTER LAUNCH. AFTER THIS, DATA COVERAGE DROPPED TO CLOSE TO 50 PERCENT UNTIL DECEMBER 1969, AND IT VARIED BETWEEN 10 AND 30 PERCENT THROUGH JULY 1971. ALMOST NO DATA WERE ACQUIRED BETWEEN JULY 1971 AND JUNE 1972. FOR THE NEXT 10 MONTHS COVERAGE WAS TYPICALLY BETWEEN 10 AND 30 PERCENT, WITH 100 PERCENT COVERAGE FOR THE MAJOR SOLAR ACTIVE PERIOD OF AUGUST 1972. FROM APRIL 1973 THROUGH FEBRUARY 1974 PERCENT COVERAGE AVERAGED 5 PERCENT.

----- PIONEER 9, BERG -----
 EXPERIMENT NAME- COSMIC DUST DETECTOR
 NSSDC ID- 68-100A-04
 LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
 AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/19/69.
 EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - D.E. BERGNASA-GSFC
 GREENBELT, MD
 EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT WAS DESIGNED TO (1) MEASURE THE COSMIC DUST FLUX DENSITY IN THE SOLAR SYSTEM, (2) DETERMINE THE DISTRIBUTION OF COSMIC DUST CONCENTRATIONS IN THE EARTH'S ORBIT, (3) DETERMINE THE GRADIENT, FLUX DENSITY, AND SPEED OF PARTICLES IN METEOR STREAMS, AND (4) PERFORM AN IN-FLIGHT CONTROL EXPERIMENT ON THE RELIABILITY OF THE MICROPHONE AS A COSMIC DUST SENSOR. THE EXPERIMENT INSTRUMENTATION WAS IDENTICAL TO THAT CARRIED ON PIONEER 8, CONSISTING ESSENTIALLY OF TWO THIN FILM-GRID DETECTORS (SEPARATED BY A DISTANCE OF 5 CM) THAT PRODUCED AN ELECTRICAL SIGNAL WHEN THE FILM WAS PENETRATED BY A MICROMETEROID. EACH FILM HAD A SENSITIVE AREA OF 100 SQ CM AND WAS COMPOSED OF 16 SEGMENTS THAT PROVIDED BOTH THE DIRECTION AND THE TIME OF FLIGHT NEEDED FOR THE METEOROID TO TRAVERSE THE 5-CM DISTANCE BETWEEN THE FRONT FILM AND REAR FILM SENSOR. THE COMBINED RESULTS OF THE PIONEER 8 AND 9 COSMIC DUST EXPERIMENTS LENT STRONG SUPPORT TO THE HYPOTHESIS THAT THE BULK OF METEOROID DUST IS OF COMETARY ORIGIN.

----- PIONEER 9, ESKLEMAN -----
 EXPERIMENT NAME- TWO-FREQUENCY BEACON RECEIVER
 NSSDC ID- 68-100A-03
 LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
 AT THE STANDARD DATA ACQUISITION RATE SINCE 05/19/69.
 EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - V.R. ESKLEMANSTANFORD U
 STANFORD, CA
 DI - T.A. CROFTSTANFORD U
 STANFORD, CA

01 - H.T. HOWARDSTANFORD U
STANFORD, CA
01 - R.L. LEADABRANDSTANFORD RES INST
MENLO PARK, CA
01 - R.A. LONGSTANFORD RES INST
MENLO PARK, CA
01 - A.M. PETERSONSTANFORD U
STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

00TH 423.3-MHZ AND ITS 2/17 SUBHARMONIC 49.8-MHZ SIGNALS WERE TRANSMITTED FROM A 46-M STEERABLE PARABOLIC ANTENNA AT STANFORD UNIVERSITY TO THE TWO-FREQUENCY RADIO RECEIVER ON THE SPACECRAFT. THE HIGH-FREQUENCY SIGNAL SERVED AS A REFERENCE SIGNAL SINCE ITS PROPAGATION TIME WAS NOT APPRECIABLY DELAYED. THE LOW-FREQUENCY SIGNAL WAS DELAYED IN PROPORTION TO THE TOTAL ELECTRON CONTENT IN THE PROPAGATION PATH. ON THE SPACECRAFT, A PHASE-LOCKED RECEIVER COUNTED THE BEAT FREQUENCY ZERO CROSSINGS OF THE RECEIVED SIGNALS TO OBTAIN MEASUREMENTS OF PHASE-PATH DIFFERENCES. DIFFERENTIAL DELAY OF THE GROUP VELOCITY WAS ALSO OBSERVED, AND THESE VALUES WERE TELEMETRED TO THE GROUND STATION AND USED TO CALCULATE THE TOTAL ELECTRON CONTENT. THE IONOSPHERIC CONTRIBUTION (UP TO A SELECTED ALTITUDE OBTAINED FROM OTHER EXPERIMENTAL TECHNIQUES) COULD BE SUBTRACTED TO PRODUCE DATA DESCRIBING THE INTERPLANETARY ELECTRON CONTENT OF THE SOLAR WIND AND ITS VARIATIONS. FOR SIMILAR EXPERIMENTS FOR OTHER TIME PERIODS SEE 67-123A-03, 66-075A-04, 66-105A-04, AND 67-060A-02. A MORE DETAILED DESCRIPTION OF THE EXPERIMENT CAN BE FOUND IN JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 17, PP. 3325-3327, AND IN RADIO SCIENCE, VOL. 6, PP. 56-63.

----- PIONEER 9, MCCracken -----

EXPERIMENT NAME- COSMIC-RAY ANISOTROPY

NSSDC ID- 68-100A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/19/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.G. MCCrackenU OF ADELAIDE
ADELAIDE, AUSTRALIA
OI - U.R. RADPHYSICAL RESEARCH LAB
AHMADABAD, INDIA
OI - W.C. BARTLEYU OF TEXAS, DALLAS
DALLAS, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A CSI SCINTILLATOR AND THREE SOLID-STATE TELESCOPES. THE CSI SCINTILLATOR WAS COLLIMATED BY AN ANTICOINCIDENCE PLASTIC SCINTILLATOR AND HAD A CONICAL APERTURE WITH A 36-DEG HALF-ANGLE. THE SCINTILLATOR LOOK DIRECTION WAS CENTERED IN THE ECLIPTIC PLANE. THREE SOLID-STATE DETECTORS WERE ORIENTED IN A FAN ARRANGEMENT WITH RESPECT TO A FOURTH SOLID-STATE DETECTOR SUCH THAT EACH OF THE FIRST THREE DETECTORS FORMED A TELESCOPE WITH THE FOURTH DETECTOR. EACH OF THE THREE TELESCOPES THUS FORMED HAD AN ACCEPTANCE CONE OF 23-DEG HALF-ANGLE. THE MEAN VIEWING DIRECTIONS OF THE TELESCOPES WERE IN THE ECLIPTIC PLANE AND 48 DEG ABOVE AND BELOW IT AT PLANE, RESPECTIVELY. TWO CONCURRENT MODES OF COUNTING WERE EMPLOYED. IN THE FIRST MODE, COUNTS WERE ACCUMULATED IN EIGHT SEPARATE 45-DEG INTERVALS DURING THE SPACECRAFT SPIN. WHILE, IN THE SECOND, SPIN-INTEGRATED COUNTS WERE ACQUIRED. IN THE FIRST MODE, THE SCINTILLATOR SEPARATELY MEASURED PARTICLES WITH ENERGIES IN THE RANGES 7.4 TO 21.5 MEV/NUCLEON AND 19.7 TO 63.0 MEV/NUCLEON (NO SPECIES DISCRIMINATION) WHILE EACH SOLID-STATE TELESCOPE SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES 3.3 TO 3.6 MEV AND 3.6 TO 6.7 MEV. IN THE SECOND MODE, THE SCINTILLATOR SEPARATELY MEASURED PARTICLES IN SIX CONTIGUOUS ENERGY INTERVALS BETWEEN 4.5 AND 40 MEV/NUCLEON (INTERVAL LOWER LIMITS AT 4.5, 7.0, 9.6, 13, 21, AND 28 MEV/NUCLEON). WHILE EACH OF THE SOLID-STATE TELESCOPES SEPARATELY MEASURED PROTONS IN THE ENERGY RANGES 1 TO 8, 1 TO 3, AND 4 TO 6 MEV AND ALPHA PARTICLES IN THE ENERGY RANGE 1 TO 8 MEV. DURING EACH 224-BIT MAIN TELEMETRY FRAME, TWO FIRST-MODE 9-BIT ACCUMULATORS AND ONE SECOND-MODE 9-BIT ACCUMULATOR WERE READ OUT. INFLIGHT CALIBRATION OF THE SCINTILLATOR AND OF SOME OF THE ELECTRONICS WAS REPORTED DAILY. SEE BUKATA ET AL, IEEE TRANS. NUC. SCI., NS-17, PP. 18-24, 1970, FOR A MORE DETAILED EXPERIMENT DESCRIPTION.

----- PIONEER 9, SCARP -----

EXPERIMENT NAME- PLASMA WAVE DETECTOR

NSSDC ID- 68-100A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/19/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.L. SCARPTRW SYSTEMS GROUP
REDONDO BEACH, CA
OI - I.H. GREENTRW SYSTEMS GROUP
REDONDO BEACH, CA
OI - G.H. CROOKTRW SYSTEMS GROUP
REDONDO BEACH, CA
OI - R.W. FREDERICKSTRW SYSTEMS GROUP
REDONDO BEACH, CA

EXPERIMENT BRIEF DESCRIPTION

ELECTROSTATIC AND ELECTROMAGNETIC PLASMA WAVES WERE MEASURED IN THE SOLAR WIND NEAR 1 AU USING AN UNBALANCED ELECTRIC DIPOLE ANTENNA. THE 423-MHZ STANFORD UNIVERSITY ANTENNA, WHICH SERVED AS THE SENSOR, WAS CAPACITIVELY COUPLED TO THREE TELEMETRY CHANNELS. CHANNEL 1 WAS A 15-PERCENT BANDPASS FILTER CENTERED AT 400 KHZ. CHANNEL 2 WAS A 15-PERCENT BANDPASS FILTER CENTERED AT 30 KHZ. THESE CHANNELS WERE EACH SAMPLED 64 TIMES PER TELEMETRY SEQUENCE. CHANNEL 3 WAS A BROADBAND 100-HZ TO 100-KHZ CHANNEL. THE BROADBAND CHANNEL WAS FED INTO A COUNT RATE METER THAT MEASURED THE NUMBER OF POSITIVE GOING PULSES PER UNIT TIME HAVING AMPLITUDES LARGE ENOUGH TO CROSS THE PRESENT TRIGGER LEVEL. THE TRIGGER LEVEL WAS VARIED THROUGH EIGHT STEPS EIGHT TIMES PER TELEMETRY SEQUENCE. THE TRIGGER LEVELS, TOGETHER WITH THE COUNT RATE AT EACH LEVEL, GAVE A MEASURE OF THE BROADBAND POWER SPECTRUM. THE TELEMETRY SEQUENCE WAS REPEATED OVER TIME INTERVALS FROM 7 MIN 28 SEC TO 472 MIN 52 SEC. WITH MOST OF THE DATA OBTAINED AT 69 MIN 44 SEC PER TELEMETRY SEQUENCE DURING THE FIRST YEAR OF ACQUISITION. THIS IMPLIES THAT ONE 8-STEP PULSE HEIGHT ANALYSIS AND EIGHT 400-KHZ AND 30-KHZ MEASUREMENTS WERE MADE EVERY 7 MIN 28 SEC.

----- PIONEER 9, SONETT -----

EXPERIMENT NAME- THREE-AXIS MAGNETOMETER

NSSDC ID- 68-100A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/19/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.P. SONETTU OF ARIZONA
TUCSON, AZ
OI - D.S. COLBURNNASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

A BOOM-MOUNTED, TRIAXIAL FLUXGATE MAGNETOMETER WAS USED TO STUDY THE INTERPLANETARY MAGNETIC FIELD AND ITS FLUCTUATIONS. THE SENSORS WERE ORIGINALLY MOUNTED WITH ONE AXIS PARALLEL TO THE SPACECRAFT SPIN AXIS. UPON COMMAND, A MOTOR INTERCHANGED A SENSOR IN THE SPIN PLANE WITH THE SENSOR ALONG THE SPIN AXIS, ENABLING INFLIGHT DETERMINATION OF ZERO LEVELS. EVERY 24 HRS, THE INSTRUMENT WAS COMMANDED INTO A SELF-CALIBRATE SEQUENCE, AND THIS WAS OFTEN REPEATED AFTER THE SENSORS WERE FLIPPED. THE INSTRUMENT, WHICH HAD A DYNAMIC RANGE OF PLUS OR MINUS 200 GAMMAS WITH A RESOLUTION OF PLUS OR MINUS 0.2 GAMMA, WAS CAPABLE OF INFLIGHT DEMODULATION OF THE SIGNALS RECEIVED FROM THE TWO SENSORS IN THE SPIN PLANE. EACH MAGNETIC FIELD COMPONENT WAS DIGITIZED INTO A 10-BIT TELEMETRY WORD. NINE MAGNETIC FIELD COMPONENTS, COMPRISING THREE MAGNETIC FIELD VECTORS, WERE TRANSMITTED IN EACH SPACECRAFT TELEMETRY FRAME.

----- PIONEER 9, WEBBER -----

EXPERIMENT NAME- COSMIC-RAY TELESCOPE

NSSDC ID- 68-100A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/19/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.R. WEBBERU OF NEW HAMPSHIRE
DURHAM, NH

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT UTILIZED A TELESCOPE COMPRISED OF FIVE SOLID-STATE SENSORS, A Cerenkov DETECTOR, AND AN ANTICOINCIDENCE SHIELD. THE TELESCOPE AXIS WAS PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. AS DETERMINED BY TWO COINCIDENCE MODES AND ELECTRONIC DISCRIMINATION OF SENSOR OUTPUT PULSES, PARTICLES MEASURED WERE ELECTRONS IN THREE CONTIGUOUS ENERGY INTERVALS BETWEEN 0.31 AND 5.1 MEV, PROTONS IN FIVE CONTIGUOUS ENERGY INTERVALS BETWEEN 2.2 AND 42 MEV, AND ALPHA PARTICLES IN THOSE CONTIGUOUS ENERGY INTERVALS BETWEEN 5.8 AND 42 MEV/NUCLEON. A THIRD COINCIDENCE MODE MEASURED THE SUM OF COUNTS DUE TO ELECTRONS ABOVE 0.6 MEV AND NUCLEI ABOVE 14 MEV/NUCLEON. A FOURTH COINCIDENCE MODE MEASURED THE SUM OF NUCLEI ABOVE 42 MEV/NUCLEON AND ELECTRONS ABOVE 5.1 MEV. SPACECRAFT SPIN-INTEGRATED DIRECTIONAL FLUXES WERE MEASURED IN THE VARIOUS MODES. ACCUMULATION TIMES AND READOUT INTERVALS WERE DEPENDENT ON THE TELEMETRY BIT RATE AND WERE TYPICALLY IN TENS OF SECONDS. IN ALL CASES, THEY WERE LONGER THAN THE SPACECRAFT SPIN PERIOD. AT THE PRESENT LOW TELEMETRY BIT RATES, THE DATA ARE RATHER SPARSE.

----- PIONEER 9, WOLFE -----

EXPERIMENT NAME- ELECTROSTATIC ANALYZER

NSSDC ID- 68-100A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 05/19/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. WOLFENASA-ARC
MOFFETT FIELD, CA
OI - D.D. MCKIBBINNASA-ARC
MOFFETT FIELD, CA

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

EXPERIMENT BRIEF DESCRIPTION

A TRUNCATED HEMISPHERICAL ELECTROSTATIC ANALYZER (120-DEG TOTAL PARALLEL PLATE CURVATURE) WITH THREE CONTIGUOUS CURRENT COLLECTORS WAS USED TO STUDY THE DIRECTIONAL INTENSITY OF THE ELECTRONS AND POSITIVE IONS IN THE SOLAR WIND. IONS WERE DETECTED IN 30 LOGARITHMICALLY EQUISPACED ENERGY PER UNIT CHARGE (E/Q) STEPS FROM 150 TO 15,000 V. THERE WAS AN ELECTRON MODE OF OPERATION IN WHICH ELECTRONS WERE MEASURED IN 14 LOGARITHMICALLY EQUISPACED E/Q STEPS RANGING FROM 12 TO 1000 V. THERE WAS ALSO A ZERO E/Q OR BACKGROUND STEP. IN OPERATION, THE ELECTRONS WERE MEASURED FIRST, THEN BACKGROUND, AND THEN THE IONS. THE THREE COLLECTORS MEASURED PARTICLES INCIDENT FROM THREE DIFFERENT CONTIGUOUS ANGULAR INTERVALS RELATIVE TO THE SPACECRAFT EQUATORIAL PLANE (SAME AS THE ECLIPTIC PLANE). TWO COLLECTORS MEASURED FLUX FROM 10 TO 85 DEG ON EITHER SIDE OF THE SPACECRAFT EQUATORIAL PLANE, AND THE THIRD MEASURED FLUX IN A 20-DEG INTERVAL CENTERED ON THE SPACECRAFT EQUATORIAL PLANE. AS THE SPACECRAFT WAS SPINNING, FLUXES WERE MEASURED IN 23 POSSIBLE 2-13/16-DEG-WIDE AZIMUTHAL ANGULAR SECTORS. SEVENTEEN OF THESE SECTORS WERE CONTIGUOUS AND ORACKETED THE SOLAR DIRECTION (AS DETERMINED BY REFERENCING THE NORMAL TO THE INSTRUMENT APERTURE TO THE SPACE SUN SENSOR PULSE). THE REMAINING SIX SECTORS WERE WIDELY SPACED. THE INSTRUMENT HAD THREE MODES OF DATA COLLECTION - POLAR SCAN, AZIMUTHAL SCAN, AND MAXIMUM FLUX. AT THE TWO HIGHEST BIT RATES (512 AND 256 DPS) THE POLAR SCAN MODE WAS ALTERNATED WITH THE AZIMUTHAL SCAN MODE AT EACH E/Q STEP. IN THE POLAR SCAN MODE, ALL THREE COLLECTORS WERE OBSERVED, AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPORTED FOR EACH COLLECTOR. IN THE AZIMUTHAL SCAN MODE, THE PEAK FLUX OBSERVED IN THE 23 AZIMUTHAL SECTORS WAS RECORDED FOR THE CENTRAL COLLECTOR AT EACH E/Q STEP. AT THE LOW BIT RATE (64, 16, AND 8 DPS), THE MAXIMUM FLUX MODE WAS USED AT EACH E/Q STEP FOLLOWED BY EITHER (1) FOR IONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT THAT E/Q STEP WHERE THE PEAK FLUX MEASUREMENT DURING THE MAXIMUM FLUX MODE WAS OBTAINED, OR (2) FOR ELECTRONS, A POLAR SCAN AND AN AZIMUTHAL SCAN AT E/Q = 100 V. IN THE MAXIMUM FLUX MODE, ONLY THE CENTRAL COLLECTOR WAS OBSERVED, AND THE PEAK FLUX OBTAINED AND THE AZIMUTHAL DIRECTION (TO 2-13/16 DEG) OF THE OBSERVATION WERE REPORTED. A COMPLETE SET OF MEASUREMENTS CONSISTED OF SEVEN SETS OF ION MEASUREMENTS (AT EACH E/Q STEP) AND ONE SET OF ELECTRON MEASUREMENTS (AT EACH E/Q STEP). AT THE HIGH BIT RATES (512 AND 256 DPS) ONE SET OF ION MEASUREMENTS TOOK 62 SEC AND ONE SET OF ELECTRON MEASUREMENTS 38 SEC. AT THE LOW BIT RATES (64, 16, AND 8 DPS), ONE SET OF ION MEASUREMENTS TOOK 37 SEC AND ONE SET OF ELECTRON MEASUREMENTS 28 SEC. AT 64 DPS, A COMPLETE SET OF MEASUREMENTS (SEVEN IONS PLUS ONE ELECTRON) WAS TAKEN AND TELEMETERED EVERY 402.5 SEC. AT 16 DPS, IT TOOK 1610 SEC, AND, AT 8 DPS, IT TOOK 3220 SEC.

***** PIONEER 10 *****

SPACECRAFT COMMON NAME- PIONEER 10
ALTERNATE NAMES- PIONEER-P, PL-723D
05860

NSSDC ID- 72-012A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

LAUNCH DATE- 03/02/72 SPACECRAFT WEIGHT- 231. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALLNASA-ARC
MOFFETT FIELD, CA
PS - J.H. WOLFENASA-ARC
MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION
PIONEER 10 WAS THE FIRST OF TWO 258-KG, SPIN-STABILIZED (AT 4.0 RPM), EARTH-POINTING SPACECRAFT DESIGNED TO PROVIDE INFORMATION ON THE INTERPLANETARY MEDIUM, THE ASTEROID BELT, AND JUPITER AND ITS ENVIRONMENT. THE SPACECRAFT COMPLEMENT OF 11 EXPERIMENTS INCLUDED PLASMA AND ENERGETIC PARTICLE DETECTORS, A MAGNETOMETER, METEOROID DETECTORS, AN IMAGING PHOTOPOLARIMETER, A UV PHOTOMETER AND AN IR RADIOMETER. PASSIVE IONOSPHERIC OCCULTATION AND CELESTIAL MECHANICS STUDIES WERE ALSO CARRIED OUT. POWER WAS PROVIDED BY FOUR BOOM-MOUNTED RADIOISOTOPE THERMOELECTRIC GENERATORS. EIGHT BIT RATES (8 TO 2048 DPS) WERE AVAILABLE. DURING JOVIAN ENCOUNTER THE BIT RATE WAS 1024 DPS. PIONEER 10 CROSSED THE JOVIAN BOW SHOCK AT ABOUT 108 PLANETARY RADII ON NOVEMBER 26, 1973; ALMOST 21 MONTHS AFTER LAUNCH AND AFTER SURVIVING ITS TRANSIT OF THE ASTEROID BELT WITH NO DAMAGE. CLOSEST APPROACH OCCURRED ON DECEMBER 4, 1973, AT 130,000 KM (1.0 PLANETARY RADII) ABOVE THE CLOUD TOPS. FINAL EXIT FROM THE JOVIAN MAGNETOSHEATH OCCURRED AT ABOUT 240 PLANETARY RADII. DESPITE THE INTENSE FLUXES OF VERY ENERGETIC PARTICLES, THE SPACECRAFT SYSTEMS (EXCEPT THE SPACECRAFT STELLAR REFERENCE ASSEMBLY) AND EXPERIMENTS (EXCEPT FOR THE ASTEROID-METEOROID DETECTOR) SURVIVED THE JOVIAN ENCOUNTER WELL. THE SPACECRAFT IS NOW ON A TRAJECTORY OF ESCAPE FROM THE SOLAR SYSTEM. IT IS EXPECTED TO TRANSMIT DATA UNTIL 1977, WHEN THE SPACECRAFT WILL BE ABOUT 20 AU IN THE DISTANCE.

----- PIONEER 10, ANDERSON -----

EXPERIMENT NAME- CELESTIAL MECHANICS

NSSDC ID- 72-012A-09

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.D. ANDERSONNASA-JPL
PASADENA, CA
OI - G.W. MULLNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION
TWO-WAY DOPPLER TRACKING OF THE SPACECRAFT WAS USED TO MAKE MORE PRECISE DETERMINATIONS OF PLANETARY MASSES, THE HELIOCENTRIC ORBIT OF JUPITER, AND THE GRAVITATIONAL FIELDS OF THE SUN, JUPITER, AND THE GALILEAN SATELLITES.

----- PIONEER 10, FILLIUS -----

EXPERIMENT NAME- JOVIAN TRAPPED RADIATION

NSSDC ID- 72-012A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. FILLIUSU OF CALIF, SAN DIEGO
SAN DIEGO, CA
OI - C.E. MCILWAINU OF CALIF, SAN DIEGO
SAN DIEGO, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF FOUR DETECTORS. A CERENKOV COUNTER MEASURED ELECTRONS ABOVE 3, 7, AND 10 MEV. A SOLID-STATE ELECTRON SCATTER DETECTOR USED THREE DISCRIMINATION LEVELS TO MEASURE ELECTRONS BETWEEN 100 KEV AND 3 MEV. A DC SCINTILLATOR DETECTOR MEASURED THE SUM OF 25- TO 250-KEV ELECTRONS AND 000-KEV TO 250-KEV PROTONS. A SECOND SOLID-STATE DETECTOR SEPARATELY MEASURED UNIDIRECTIONAL 60- TO 250-NEV PROTONS AND MINIMUM IONIZING PARTICLES. THE FIRST THREE DETECTORS LOOKED PERPENDICULAR TO THE SPACECRAFT SPIN AXIS. EACH DETECTOR HAD A 30 DEG HALF-ANGLE APERTURE, AND EACH MADE EIGHT MEASUREMENTS PER SPACECRAFT SPIN PERIOD. WHILE THIS EXPERIMENT IS PRIMARILY DESIGNED FOR ENCOUNTER, DATA WERE OBTAINED AT A LOW RATE IN INTERPLANETARY SPACE.

----- PIONEER 10, GENRELS -----

EXPERIMENT NAME- IMAGING PHOTOPOLARIMETER (IPP)

NSSDC ID- 72-012A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T. GENRELSU OF ARIZONA
TUCSON, AZ
OI - D.L. COFFEENU OF ARIZONA
TUCSON, AZ
OI - J. HANEEN-ANTILLAU OF ARIZONA
TUCSON, AZ
OI - C.E. KENKNIGHTU OF ARIZONA
TUCSON, AZ
OI - R.F. HUMMERSANTA BARBARA RES CTR
GOLETA, CA
OI - M.G. TOMASKOU OF ARIZONA
TUCSON, AZ
OI - W. SWINDELLU OF ARIZONA
TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION
THE IMAGING PHOTOPOLARIMETER EXPERIMENT (IPP) WAS USED DURING JOVIAN ENCOUNTER TO MAKE SIMULTANEOUS TWO-COLOR (BLUE - 3900 TO 4900 Å, RED - 5800 TO 7000 Å) POLARIMETRIC AND RADIO-METRIC MEASUREMENTS, AND MODERATE-RESOLUTION (ABOUT 200 KM AT BEST) SPIN-SCAN IMAGES OF JUPITER AND THE JOVIAN SATELLITES. THE POLARIMETRIC AND RADIO-METRIC WORK WAS PERFORMED USING AN 8- X 0- HRAD FIELD-STOP APERTURE, WHILE THE SPIN-SCAN IMAGING USED A 0.5- X 0.6- HRAD APERTURE STOP. RELATIVE RADIO-METRIC CALIBRATION WAS DERIVED USING AN INTERNAL TUNGSTEN LAMP. LONG-TERM ABSOLUTE CALIBRATION OF THE INSTRUMENT WAS ACCOMPLISHED BY MEANS OF A SUNLIGHT DIFFUSER/ATTENUATOR ELEMENT LOCATED IN THE SPACECRAFT ANTENNA STRUCTURE. I.E., PRIMARY RADIO-METRIC CALIBRATION WAS OBTAINED THROUGHOUT THE MISSION BY PERIODICALLY COMMANDING THE TELESCOPE TO VIEW THIS DIFFUSE BACKLIGHTED (SUNLIGHT) SOURCE. THE EXPERIMENTAL TRAIN FOR THE IPP PACKAGE CONSISTED OF THE FOLLOWING ELEMENTS -- (1) A NEAR-DIFFRACTION-LIMITED 2.54-CM MAKASUTOV CATADIOPTRIC TELESCOPE (F/3.4), (2) A FOCAL PLANE WHEEL CONTAINING FIELD-OF-VIEW APERTURES, DEPOLARIZERS, CALIBRATION SOURCE, ETC., (3) A WOLLASTON PRISM TO SPLIT LIGHT INTO TWO ORTHOGONALLY POLARIZED BEAMS, (4) A 45-DEG DICHROMATIC MIRROR THAT REFLECTED WAVELENGTHS LESS THAN 5500 Å (BLUE BEAM) AND TRANSMITTED ALL LIGHT OF GREATER WAVELENGTH (RED BEAM), (5) FOR EACH SPECTRAL BEAM (TWO POLARIZATIONS), A FILTERING COATED RELAY LENS AND FOLDING MIRRORS, AND (6) FOR EACH SPECTRAL BEAM, TWO BENDIX CHANNELTRON DETECTORS (BLUE R1A1A1 3-11 PHOTOCATHODES RED R-20 PHOTOCATHODES) TO

REGISTER THE INTENSITY IN EACH POLARIZATION COMPONENT. (NOTE - THIS EXPERIMENT WAS ALSO ABOARD PIONEER 11.)

----- PIONEER 10, JUDGE -----

EXPERIMENT NAME- ULTRAVIOLET PHOTOMETRY

NSSDC ID- 72-012A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.L. JUDGEU OF SOUTHERN CALIF
LOS ANGELES, CA
OI - R.W. CARLSONU OF SOUTHERN CALIF
LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT, CONSISTING OF A BROADBAND PHOTOMETER SENSITIVE BETWEEN 200 AND 800 Å, OBSERVED EVIDENCE OF HELIUM, WHICH IN TURN INDICATED INTERACTIONS BETWEEN CHARGED PARTICLES AND NEUTRAL HYDROGEN. DURING THE CRUISE PHASE OF THE MISSION, THIS EXPERIMENT WAS USED TO SEARCH FOR THE SUPERSONIC TO SUBSONIC TRANSITION REGION IN THE SOLAR WIND. DURING THE JOVIAN ENCOUNTER, THIS EXPERIMENT WAS USED TO LOOK FOR EVIDENCE OF AN AURORAL QUAL ON THE JOVIAN DAYSIDE, TO FIND THE RATIO OF HYDROGEN TO HELIUM IN THE JOVIAN ATMOSPHERE, AND TO FIND THE TEMPERATURE OF THE OUTER PORTION OF THE JOVIAN ATMOSPHERE.

----- PIONEER 10, KINARD -----

EXPERIMENT NAME- METEOROID DETECTORS

NSSDC ID- 72-012A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - H.H. KINARDNASA-LARC
HAMPTON, VA
OI - H.E. TURNERNASA-MSFC
HUNTSVILLE, AL
OI - J.M. ALVAREZNASA-LARC
HAMPTON, VA
OI - D.H. HUMESNASA-LARC
HAMPTON, VA
OI - R.L. D'NFALNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO MEASURE THE NUMBER OF METEOROID IMPACTS ON THE PIONEER 10 SPACECRAFT BY MEANS OF 12 PANELS, EACH CONTAINING 16 PRESSURIZED CELLS, MOUNTED ON THE BACK OF THE ANTENNA DISK. THE TOTAL EXPOSED AREA WAS 0.465 M². EACH PANEL OF GAS-FILLED CELLS CONSISTED OF A 1-MIL-THICK AND A 2-MIL-THICK SHEET OF STAINLESS STEEL WELDED TOGETHER IN SUCH A WAY THAT MANY SMALL POCKETS OF GAS WERE LEFT BETWEEN THEM. WHENEVER A POCKET WAS PUNCTURED, THE GAS ESCAPED AND A COLD CATHODE DEVICE DETECTED THE LOSS. THE RATE OF PRESSURE LOSS INDICATED THE SIZE OF THE HOLE MADE, AND THUS THE COMBINATION OF THESE DATA WITH TRAJECTORY DATA PROVIDED AN INDICATION OF THE SPATIAL DENSITY OF THE PARTICLES. THE 1-MIL-THICK SIDE OF THE GAS PANEL WAS EXPOSED TO THE INTERPLANETARY MEDIUM, AND PENETRATIONS OF THE CELLS FROM THAT SIDE INDICATED ENCOUNTERS WITH PARTICLES HAVING MASSES OF 1 NANOGRAM OR MORE. SOME 300 TO 400 HITS WERE EXPECTED BY THE TIME THE SPACECRAFT COMPLETED ITS 200-DAY JOURNEY THROUGH THE ASTEROID BELT. AFTER PIONEER 10 ENTERED THE ASTEROID BELT BETWEEN MARS AND JUPITER ON JULY 1, 1972, THE METEOROID EXPERIMENT DETECTED UNUSUALLY LARGE NUMBERS OF METEORIODS AND DUST PARTICLES.

----- PIONEER 10, KLIORE -----

EXPERIMENT NAME- S-BAND OCCULTATION

NSSDC ID- 72-012A-10

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - A.J. KLIORENASA-JPL
PASADENA, CA
OI - G. FJELDRONASA-JPL
PASADENA, CA
OI - D.L. CAINNASA-JPL
PASADENA, CA
OI - D.L. SEIDELNASA-GISS
NEW YORK, NY
OI - S.I. RASOOLNASA HEADQUARTERS
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT UTILIZED RADIO REFRACTION EFFECTS ON THE SPACECRAFT'S S-BAND RADIO SIGNAL TO DETERMINE THE VERTICAL DISTRIBUTION OF NEUTRAL AND IONIZED SPECIES IN THE JOVIAN ATMOSPHERE.

----- PIONEER 10, MCDONALD -----

EXPERIMENT NAME- COSMIC-RAY SPECTRA

NSSDC ID- 72-012A-12

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - F.D. MCDONALDNASA-GSFC
GREENBELT, MD
OI - K.G. MCCrackenU OF ADELAIDE
ADELAIDE, AUSTRALIA
OI - W.R. WEBBERU OF NEW HAMPSHIRE
DURHAM, NH
OI - E.C. ROELOFAPPLIED PHYSICS LAB
SILVER SPRING, MD
OI - J.H. TRAINORNASA-GSFC
GREENBELT, MD
OI - D.J. TEEGARDENNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF THREE MULTIELEMENT SOLID-STATE TELESCOPES, ALL LOOKING NORMAL TO THE SPACECRAFT SPIN AXIS. THE HIGH-ENERGY TELESCOPE (HET) CONSISTED OF FIVE COLLIMATED SENSORS AND MEASURED STOPPING PARTICLES (Z = 1 TO 8) IN THE ENERGY RANGE 20 TO 50 MEV/NUCLEON AND PENETRATING PARTICLES IN THE RANGE 50 TO 800 MEV/NUCLEON. CHARGE RESOLUTION FOR PENETRATING PARTICLES WAS POSSIBLE UP TO 200 MEV/NUCLEON. THE FIRST LOW-ENERGY TELESCOPE (LET-I) HAD FOUR ELEMENTS AND MEASURED STOPPING Z = 1 TO 8 PARTICLES IN THE ENERGY RANGE 3 TO 32 MEV/NUCLEON. THE SECOND LOW-ENERGY TELESCOPE (LET-II) HAD THREE ELEMENTS AND MEASURED STOPPING ELECTRONS BETWEEN 50 AND 1000 KEV AND STOPPING PROTONS BETWEEN 50 KEV AND 20 MEV. FOR EACH TELESCOPE, COUNT RATES WERE OBTAINED FOR EACH OF SEVERAL SENSOR COINCIDENCE-ANTICOINCIDENCE MODES. SOME OF THE RATES FROM EACH TELESCOPE WERE SECTORED INTO EIGHT OCTANTS IN THE SPACECRAFT SPIN PLANE. IN ADDITION, THREE-SENSOR PULSE HEIGHT ANALYSIS, WITH PRIORITY SCHEMES FAVORING THE ANALYSIS OF HEAVIER PARTICLES, WAS ASSOCIATED WITH EACH TELESCOPE.

----- PIONEER 10, SIMPSON -----

EXPERIMENT NAME- CHARGED PARTICLE COMPOSITION

NSSDC ID- 72-012A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.A. SIMPSONU OF CHICAGO
CHICAGO, IL
OI - J.J. D'GALLAGHERU OF MARYLAND
COLLEGE PARK, MD
OI - A. TUZZOLINOU OF CHICAGO
CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO MEASURE CHARGE COMPOSITION USING THREE TYPES OF DETECTORS - (1) A SEVEN-ELEMENT SOLID-STATE DETECTOR TELESCOPE, (2) A HIGH-ENERGY ELECTRON DETECTOR (EGG), AND (3) A HIGH-ENERGY PROTON DETECTOR (FISSION FOIL). THE FIRST DETECTOR WAS TO MEASURE PROTONS (450 KEV TO 150 MEV), ELECTRONS (200 KEV TO 30 MEV), AND PARTICLES FROM HE (Z = 2) TO O (Z = 16) (8 TO 160 MEV/NUCLEON). THE SECOND DETECTOR WAS TO MEASURE BREMSSTRAHLUNG RADIATION FROM ELECTRONS AND ELECTRONS DIRECTLY (EGT, 9 MEV) AND IS DESIGNED TO EXCLUDE PROTONS OF ENERGIES LESS THAN 50 MEV. THE THIRD DETECTOR WAS TO MEASURE PROTONS OF ENERGIES GREATER THAN 50 MEV. THE DETECTOR SAMPLE TIME WAS TO BE SYNCHRONIZED WITH THE SPACECRAFT SPIN AND SHOULD BE 1/8 SPACECRAFT ROTATION OR ABOUT 1-1/2 SEC.

----- PIONEER 10, SMITH -----

EXPERIMENT NAME- MAGNETIC FIELDS

NSSDC ID- 72-012A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - E.J. SMITHNASA-JPL
PASADENA, CA
OI - D.S. COLBURNNASA-ARC
MOFFETT FIELD, CA
OI - P. DYALNASA-ARC
MOFFETT FIELD, CA
OI - C.P. SONETTU OF ARIZONA
TUCSON, AZ
OI - P.J. COLEMAN, JR.U OF CALIF, LA
LOS ANGELES, CA
OI - L. DAVISCALIF INST OF TECH
PASADENA, CA
OI - D.E. JONESBRIGHAM YOUNG U
PROVO, UT

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

EXPERIMENT BRIEF DESCRIPTION
THE MAGNETOMETER ON PIONEER 10 WAS A TRIAXIAL HELIUM MAGNETOMETER WITH SEVEN DYNAMIC RANGES, FROM PLUS OR MINUS 2.5 GAUSS TO PLUS OR MINUS 10 GAUSS. THE LINEARITY WAS 0.1 PERCENT, AND THE NOISE THRESHOLD WAS 0.01 GAMMA RMS FOR 0-1 HZ. THE ACCURACY WAS 0.5 PERCENT OF FULL SCALE RANGE.

----- PIONEER 10, SODERMAN -----

EXPERIMENT NAME- ASTEROID/METEOROID ASTRONOMY

NSSDC ID- 72-012A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.K. SODERMANDREXEL INST OF TECH
PHILADELPHIA, PA

OI - H.A. ZIMMNASA-JSC
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT SEARCHED FOR PARTICLES WITH MASSES LARGER THAN ABOUT ONE MICROGRAM BY OBSERVING THE SOLAR LIGHT THEY REFLECTED AND SCATTERED. FOUR INDEPENDENT TELESCOPIC SUBSYSTEMS WITH FOUR OVERLAPPING FIELDS OF VIEW WERE USED, WITH THE ENTRY AND DEPARTURE TIMES OF THE LIGHT FROM THE PARTICLES BEING USED TO DETERMINE THE RANGE AND VELOCITIES OF THE PARTICLES THEMSELVES. THE OPTICAL SUBSYSTEMS WERE COMPOSED OF 8-IN. RITCHIEY-CRETEN TELESOPES WITH A 10-IN. FOCAL LENGTH AND A 0.2-RAD FIELD OF VIEW.

----- PIONEER 10, VAN ALLEN -----

EXPERIMENT NAME- JOVIAN CHARGED PARTICLES EXPERIMENT

NSSDC ID- 72-012A-11

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.A. VAN ALLENU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE PARTICLES IN THE VICINITY OF JUPITER USING THREE SETS OF DETECTORS -- (1) A THREE-ELEMENT GEIGER TUBE TELESCOPE, (2) A THREE-ELEMENT TRIANGULAR ARRAY OF DETECTORS, AND (3) A LOW-ENERGY GEIGER TUBE DETECTOR. THE FIRST DETECTOR IS TO MEASURE ELECTRONS (E.G.T. 2 MEV) AND PROTONS (E.G.T. 10 MEV). THE SECOND IS TO MEASURE ELECTRONS (E.G.T. 10 MEV). AND THE THIRD IS ALSO TO MEASURE ELECTRONS (E.G.T. 50 KEV). THE DETECTOR SAMPLE TIME IS TO BE SYNCHRONIZED WITH THE SPACECRAFT TELEMETRY SYSTEM AND WOULD DEPEND UPON THE TELEMETRY BIT RATE, I.E., THE SAMPLE TIME MAY RANGE FROM 3/32 SEC TO 12 SEC. USEFUL JOVIAN AND INTERPLANETARY DATA HAVE BEEN OBTAINED.

----- PIONEER 10, WEINBERG -----

EXPERIMENT NAME- ZODIACAL-LIGHT TWO-COLOR
PHOTOPOLARIMETRY

NSSDC ID- 72-012A-14

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.L. WEINBERGSTATE U OF NEW YORK
ALBANY, NY

OI - M.S. MANNERSTATE U OF NEW YORK
ALBANY, NY

EXPERIMENT BRIEF DESCRIPTION

THE IMAGING PHOTOPOLARIMETER EXPERIMENT (IPP) WAS USED TO OBTAIN MAPS OF THE ZODIACAL LIGHT DISTRIBUTION IN TWO COLORS, BLUE (3900 TO 4900 Å) AND RED (5800 TO 7000 Å). IN EACH COLOR, THE MAPS WERE CONSTRUCTED OUT OF THE INTEGRATED-DETECTOR-RESPONSE (1/64 OF A ROLL PERIOD). SPIN-SCAN POINT-IMAGING DATA OBTAINED BY VIEWING THROUGH A 40-X 40-MRAD SO FIELD-STOP APERTURE. THIS WORK WAS PERFORMED DURING THE CRUISE PORTION OF THE MISSION. DETAILED SIMULTANEOUS RADIO-METRIC AND POLARIMETRIC MAPS OF BOTH SKY COLORS WERE MADE AS THE SPACECRAFT SWEEP OUT A 360-DEG CLOCK ANGLE SWATH, AND THE TELESCOPE AND OPTICS WERE STEPPED IN CONE ANGLE (THE ANGLE BETWEEN SPACECRAFT SPIN AXIS AND THE TELESCOPE OPTICAL AXIS). AT EACH DISCRETE CONE ANGLE, A 10 ROLL MEASUREMENT CYCLE OCCURRED, CONSISTING OF 10 ROLLS OR THE ACCUMULATION OF THE DATA AND FOR CALIBRATION. ALTERNATED WITH 10 ROLL PERIODS USED FOR THE TELEMETRY OF THE DATA. DURING A DATA ROLL, THE SIGNALS FROM FOUR DETECTORS (2/COLOR) WERE INTEGRATED OVER A TIME INTERVAL EQUAL TO 1/64 OF THE ROLL PERIOD. THE FOUR CHANNELS PROVIDED SIMULTANEOUS MEASUREMENTS AT TWO ORTHOGONAL POLARIZATION AZIMUTHS IN THE TWO SPECTRAL BANDS. THE POLARIZATION WAS SAMPLED PARALLEL AND PERPENDICULAR TO THE PLANE CONTAINING THE SPACECRAFT SPIN AXIS AND THE OPTICAL AXIS OF THE TELESCOPE. RADIOACTIVE CALIBRATION WAS PROVIDED BY A RADIOISOTOPE-ACTIVATED PHOSPHOR SOURCE. ALL SUCH DATA WERE FORMATTED TO PRODUCE A SKY MAP. 360 DEG IN CLOCK ANGLE BY 141 DEG IN CONE ANGLE. THE EXPERIMENTAL TRAIN FOR THE IPP PACKAGE CONSISTED OF THE

FOLLOWING ELEMENTS -- (1) A NEAR-DIFFRACTION-LIMITED 2.04-CM MAKUTOV CATADIOPTRIC TELESCOPE (F/3.4). (2) A FOCAL PLANE WHEEL CONTAINING FIELD-OF-VIEW APERTURES, DEPOLARIZERS, CALIBRATION SOURCE, ETC.. (3) A WOLLASTON PRISM TO SPLIT LIGHT INTO TWO ORTHOGONALLY POLARIZED BEAMS. (4) A 45-DEG DICHROMATIC MIRROR THAT REFLECTED WAVELENGTHS LESS THAN 5000 Å (BLUE BEAM) AND TRANSMITTED ALL LIGHT OF GREATER WAVELENGTH (RED BEAM). (5) FOR EACH SPECTRAL BEAM (TWO POLARIZATIONS), A FILTERING COATED RELAY LENS AND FOLDING MIRRORS, AND (6) FOR EACH SPECTRAL BEAM, TWO RENDIX CHANNELTRON DETECTORS (BLUE - BIALKALI S-11 PHOTOCATHODES, RED-S-20 PHOTOCATHODES) TO REGISTER THE INTENSITY IN EACH POLARIZATION COMPONENT. (NOTE - THIS EXPERIMENT WAS ALSO ABOARD PIONEER 11.)

----- PIONEER 10, WOLFE -----

EXPERIMENT NAME- PLASMA EXPERIMENT

NSSDC ID- 72-012A-13

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 03/03/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. WOLFENASA-ARC
MOFFETT FIELD, CA

OI - L.A. FRANKU OF IOWA
IOWA CITY, IA

OI - R. LUSTMPI
GARCHING, FED REP OF GERMANY

OI - D.S. INTRILIGATORU OF SOUTHERN CALIF
LOS ANGELES, CA

OI - D.D. MCKIBBINNASA-ARC
MOFFETT FIELD, CA

OI - V.T. ZAVIENTSEFFNASA-ARC
MOFFETT FIELD, CA

OI - F.L. SCARFTRW SYSTEMS GROUP
REDONDO BEACH, CA

OI - H.R. COLLARDNASA-ARC
MOFFETT FIELD, CA

OI - M.C. FELDMANLOS ALAMOS SCI LAB
LOS ALAMOS, NM

OI - Z.A. SMITHNASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

TWO QUADRISPHERICAL ELECTROSTATIC ANALYZERS WERE USED TO STUDY THE DIRECTIONAL INTENSITY OF SOLAR WIND IONS AND ELECTRONS. THE DETECTORS WERE USED TO OBSERVE A POSSIBLE JOVIAN ROW SHOCK, MAGNETOSHEATH, AND MAGNETOPAUSE. THE INSTRUMENTS STUDIED POSITIVE IONS IN 32 ENERGY/CHARGE STEPS BETWEEN 10 V AND 10 KV, AND ELECTRONS IN 16 STEPS BETWEEN 100 V AND 18 KV.

***** PIONEER 11 *****

SPACECRAFT COMMON NAME- PIONEER 11
ALTERNATE NAMES- PIONEER-G, PL-733C
0421

NSSDC ID- 73-019A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

LAUNCH DATE- 04/06/73 SPACECRAFT WEIGHT- 231. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - C.F. HALLNASA-ARC
MOFFETT FIELD, CA

PS - J.H. WOLFENASA-ARC
MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

PIONEER 11 WAS THE SECOND OF TWO 231-KG, SPIN-STABILIZED EARTH POINTING SPACECRAFT DESIGNED TO PROVIDE INFORMATION ON THE INTERPLANETARY MEDIUM, THE ASTEROID BELT AND THE NEAR-JUPITER ENVIRONMENT. THIS JUPITER FLY-BY SPACECRAFT WAS POWERED BY A RADIOISOTOPE THERMOELECTRIC GENERATOR AND A BATTERY. THE SPACECRAFT INSTRUMENTATION STUDIED THE INTERPLANETARY AND POSSIBLE JOVIAN MAGNETIC FIELDS, THE SOLAR WIND AND POSSIBLE JOVIAN ROW SHOCK AND MAGNETOPAUSE BOUNDARIES, SOLAR AND GALACTIC COSMIC RAYS, INTERPLANETARY CHARGED PARTICLES AND POSSIBLE JOVIAN TRAPPED RADIATION, JOVIAN THERMAL ENERGY FLUX, ZODIACAL LIGHT, ASTEROIDS AND METEORIDS, AND INTERPLANETARY AND JOVIAN ULTRAVIOLET RADIATION. AN S-BAND OCCULTATION EXPERIMENT AND A JUPITER IMAGING AND PHOTOPOLARIZATION EXPERIMENT WERE PERFORMED. THE SPACECRAFT WAS TO EXPERIENCE CLOSEST JUPITER APPROACH (0.6 PLANETARY RADII FROM SURFACE) ON DECEMBER 3, 1974, AND DEPENDING ON THE AMOUNT OF THRUSTER FUEL LEFT AFTER THE JUPITER ENCOUNTER, CONTINUE ON TO ENCOUNTER WITH SATURN APPROXIMATELY 7 YEARS AFTER LAUNCH.

----- PIONEER 11, ANDERSON -----

EXPERIMENT NAME- CELESTIAL MECHANICS

NSSDC ID- 73-019A-09

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.O. ANDERSONNASA-JPL
PASADENA, CA
OI - G.W. NULLNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION
TWO-WAY DOPPLER TRACKING OF THE SPACECRAFT WAS USED TO
MAKE MORE PRECISE DETERMINATIONS OF PLANETARY MASSES, THE
HELIOCENTRIC ORBIT OF JUPITER, AND THE GRAVITATIONAL FIELDS OF
THE SUN, JUPITER, AND THE GALILEAN SATELLITES.

----- PIONEER 11, FILLIUS -----

EXPERIMENT NAME- JOVIAN TRAPPED RADIATION

NSSDC ID- 73-019A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.B. FILLIUSU OF CALIF., SAN DIEGO
SAN DIEGO, CA
OI - C.E. MCILWAINU OF CALIF., SAN DIEGO
SAN DIEGO, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF FOUR DETECTORS. A CERENKOV
COUNTER MEASURED ELECTRONS ABOVE 3, 7, AND 10 MEV. A
SOLID-STATE ELECTRON SCATTER DETECTOR USED THREE
DISCRIMINATION LEVELS TO MEASURE ELECTRONS BETWEEN 100 KEV AND
3 MEV. A DC SCINTILLATOR DETECTOR MEASURED THE SUM OF 25- TO
250-KEV ELECTRONS AND 800-KEV TO 250-MEV PROTONS. A SECOND
SOLID-STATE DETECTOR MEASURED SEPARATELY OMNIDIRECTIONAL 60-
TO 250-MEV PROTONS AND MINIMUM IONIZING PARTICLES. THE FIRST
THREE DETECTORS LOOKED PERPENDICULAR TO THE SPACECRAFT SPIN
AXIS. EACH DETECTOR HAD A 30-DEG HALF-ANGLE APERTURE, AND
EACH MADE EIGHT MEASUREMENTS PER SPACECRAFT SPIN PERIOD.
WHILE THIS EXPERIMENT WAS DESIGNED PRIMARILY FOR ENCOUNTER, IT
DID OBTAIN DATA AT A LOW RATE IN INTERPLANETARY SPACE.

----- PIONEER 11, GENRELS -----

EXPERIMENT NAME- IMAGING PHOTOPOLARIMETER

NSSDC ID- 73-019A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - T. GENRELSU OF ARIZONA
TUCSON, AZ
OI - D.L. COFFEENU OF ARIZONA
TUCSON, AZ
OI - J. HAMEEN-ANTILLAU OF ARIZONA
TUCSON, AZ
OI - C.E. KENKNIGHTU OF ARIZONA
TUCSON, AZ
OI - R.P. HUMMERSANTA BARBARA RES CTR
GOLETA, CA
OI - H.G. TOMASKOU OF ARIZONA
TUCSON, AZ
OI - W. SWINDELLU OF ARIZONA
TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION
THE IMAGING PHOTOPOLARIMETER EXPERIMENT (IPP) WAS USED
DURING JOVIAN ENCOUNTER TO MAKE SIMULTANEOUS, TWO COLOR (BLUE
- 3900 TO 4900 Å, RED - 5800 TO 7000 Å) POLARIMETRIC AND
RADIOMETRIC MEASUREMENTS, AND MODERATE RESOLUTION (ABOUT 200
KM AT BEST) SPIN-SCAN IMAGES OF JUPITER AND THE JOVIAN
SATELLITES. THE POLARIMETRIC AND RADIOMETRIC WORK WAS
PERFORMED USING AN 8- X 8-MRAD FIELD-STOP APERTURE, WHILE THE
SPIN-SCAN IMAGING USED A 0.5- X 0.5-MRAD APERTURE STOP.
RELATIVE RADIOMETRIC CALIBRATION WAS DERIVED USING AN INTERNAL
TUNGSTEN LAMP. LONG-TERM ABSOLUTE CALIBRATION OF THE
INSTRUMENT WAS ACCOMPLISHED BY MEANS OF A SUNLIGHT
DIFFUSOR/ATTENUATOR ELEMENT LOCATED IN THE SPACECRAFT ANTENNA
STRUCTURE. THAT IS, PRIMARY RADIOMETRIC CALIBRATION WAS
OBTAINED THROUGHOUT THE MISSION BY PERIODICALLY COMMANDING THE
TELESCOPE TO VIEW THIS DIFFUSE BACKLIGHTED (SUNLIGHT) SOURCE.
THE EXPERIMENTAL TRAIN FOR THE IPP PACKAGE CONSISTED OF THE
FOLLOWING ELEMENTS -- (1) A NEAR-DIFFRACTION-LIMITED 2.54-CM
MATSUBUO TELESCOPE OF FOCAL RATIO F/3.4, (2) A FOCAL PLANE
WHEEL CONTAINING FOV APERTURES, DEPOLARIZERS, CALIBRATION
SOURCE, ETC., (3) A MOLLATON PRISM TO SPLIT THE LIGHT INTO
TWO ORTHOGONALLY POLARIZED BEAMS, (4) A 45-DEG DICHRONATIC
MIRROR THAT REFLECTS WAVELENGTHS OF LESS THAN 5500 Å (BLUE
BEAM) AND TRANSMITS ALL LIGHT OF GREATER WAVELENGTH (RED
BEAM), (5) FOR EACH SPECTRAL BAND (TWO POLARIZATIONS ARE
SEPARATED) A FILTERING-COATED REIN LENS AND FOLDING MIRRORS,
AND (6) FINALLY, FOR EACH SPECTRAL BEAM TWO BENDIX CHANNELTRON
(BLUE - BIALKALI 5-11 PHOTOCATHODES, RED - S-20) PHOTOCATHODES
TO REGISTER THE INTENSITY IN EACH POLARIZATION COMPONENT.
(NOTE - THIS EXPERIMENT WAS ALSO ADDED PIONEER 10.)

----- PIONEER 11, JUDGE -----

EXPERIMENT NAME- ULTRAVIOLET PHOTOMETRY

NSSDC ID- 73-019A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.L. JUDGEU OF SOUTHERN CALIF
LOS ANGELES, CA
OI - R.W. CARLSONU OF SOUTHERN CALIF
LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT, A BROADBAND PHOTOMETER SENSITIVE
BETWEEN 200 AND 800 Å, OBSERVED EVIDENCE OF HELIUM, WHICH IN
TURN INDICATED INTERACTIONS BETWEEN CHARGED PARTICLES AND
NEUTRAL HYDROGEN. DURING THE CRUISE PHASE OF THE MISSION THIS
EXPERIMENT WAS USED TO SEARCH FOR THE SUPERSONIC TO SUBSONIC
TRANSITION REGION IN THE SOLAR WIND. DURING THE JOVIAN
ENCOUNTER, THIS EXPERIMENT WAS USED TO LOOK FOR EVIDENCE OF AN
AURORAL OVAL ON THE JOVIAN DAYSIDE, TO FIND THE RATIO OF
HYDROGEN TO HELIUM IN THE JOVIAN ATMOSPHERE, AND TO FIND THE
TEMPERATURE OF THE OUTER PORTION OF THE JOVIAN ATMOSPHERE.

----- PIONEER 11, KINARD -----

EXPERIMENT NAME- METEOROID DETECTORS

NSSDC ID- 73-019A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - W.H. KINARDNASA-LARC
HAMPTON, VA
OI - J.W. ALVAREZNASA-LARC
HAMPTON, VA
OI - D.H. HUMESNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION
THE PIONEER-G METEOROID DETECTION EXPERIMENT ATTEMPTED
TO DETECT THE DISTRIBUTION IN INTERPLANETARY SPACE OF
METEOROIDS TOO SMALL TO BE SEEN BY LIGHT SCATTERING
TECHNIQUES. TWELVE PANELS, EACH CONTAINING 18 PRESSURIZED
CELLS, WERE MOUNTED ON THE BACK OF THE SPACECRAFT ANTENNA
DISH. THE PRESSURIZED CELLS CONSISTED OF A 2-MIL-THICK
STAINLESS STEEL OUTER LAYER WELDED TO A 1-MIL-THICK STAINLESS
STEEL INNER LAYER WITH A LARGE NUMBER OF SMALL POCKETS OF GAS
TRAPPED BETWEEN THEM. LOSS OF GAS PRESSURE FROM ANY OF THE
CELLS INDICATED A HIT, AND THE RATE OF GAS LOSS INDICATED THE
SIZE OF THE HOLE MADE. THUS THE MASS AND INCIDENT ENERGY OF
THE METEOROID PARTICLE COULD BE OBTAINED AND, WHEN COMBINED
WITH TRAJECTORY DATA, ALLOWED THE SPATIAL DENSITY OF THE
METEORIDS TO BE DETERMINED. THE PANELS DETECTED IMPACTS,
WITH PARTICLES HAVING A MASS OF GREATER THAN 1E-8 GM. THE
PANELS COVERED 0.46 M² OF EXPOSED AREA ON PIONEER-G.
RESULTS FROM THIS EXPERIMENT WERE COMBINED WITH THOSE FROM A
SIMILAR EXPERIMENT FLOWN ON PIONEER 10 TO DETERMINE THE RANGE
IN MASS OF SMALL PARTICLES ON BOTH THE INNER AND OUTER
BOUNDARIES AND WITHIN THE ASTEROID BELT.

----- PIONEER 11, KLIORE -----

EXPERIMENT NAME- S-BAND OCCULTATION

NSSDC ID- 73-019A-10

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - A.J. KLIORENASA-JPL
PASADENA, CA
OI - G. FJELDOGNASA-JPL
PASADENA, CA
OI - D.L. CAINNASA-JPL
PASADENA, CA
OI - D.L. SEIDELNASA-GISS
NEW YORK, NY
OI - S.I. RASOOLNASA HEADQUARTERS
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT UTILIZED RADIO REFRACTION EFFECTS ON THE
SPACECRAFT S-BAND RADIO SIGNAL TO DETERMINE THE VERTICAL
DISTRIBUTION OF NEUTRAL AND IONIZED SPECIES IN THE JOVIAN
ATMOSPHERE.

----- PIONEER 11, McDONALD -----

EXPERIMENT NAME- COSMIC-RAY SPECTRA

NSSDC ID- 73-019A-12

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.U. McDONALDNASA-GSFC
GREENBELT, MD

OI - K.G. MCCrackenU OF ADELAIDE
ADELAIDE, AUSTRALIA

OI - W.R. WEBERU OF NEW HAMPSHIRE
DURHAM, NH

OI - E.C. ROELOFAPPLIED PHYSICS LAB
SILVER SPRING, MD

OI - B.J. TEIGARDENNASA-GSFC
GREENBELT, MD

OI - J.H. TRIMMERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF THREE 3-ELEMENT TELESCOPES,
ALL LOOKING NORMAL TO THE SPACECRAFT SPIN AXIS. A
BIDIRECTIONAL TELESCOPE MEASURED 20- TO 800-MEV/NUCLEON
PARTICLES WITH 5 TO 10 PERCENT ENERGY RESOLUTION. ANOTHER
TELESCOPE MEASURED 3- TO 22-MEV/NUCLEON PARTICLES WITH 5
PERCENT RESOLUTION. THESE TWO TELESCOPES MEASURED PARTICLES
WITH Z VALUES BETWEEN 1 AND 8. THE THIRD TELESCOPE MEASURED
50-KEV TO 1-MEV ELECTRONS AND 50-KEV TO 20-MEV PROTONS WITH 20
PERCENT RESOLUTION.

----- PIONEER 11, MUNCH -----

EXPERIMENT NAME- INFRARED RADIOMETER

NSSDC ID- 73-019A-00

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT 2000 DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G. MUNCHCALIF INST OF TECH
PASADENA, CA

OI - R.W. BOESENASA-ARC
HOFFETT FIELD, CA

OI - S.C. CHASE, JR.SANTA BARBARA RES CTR
GOLETA, CA

OI - A.P. INGERSOLLCALIF INST OF TECH
PASADENA, CA

OI - G. NEUGERAUERCALIF INST OF TECH
PASADENA, CA

OI - L.W. THAFTONU OF TEXAS, AUSTIN
AUSTIN, TX

EXPERIMENT BRIEF DESCRIPTION
THE PIONEER G INFRARED RADIOMETER EXPERIMENT MEASURED
THE JOVIAN THERMAL BALANCE, TEMPERATURE DISTRIBUTION IN THE
OUTER ATMOSPHERE, GENERAL SURFACE COMPOSITION INCLUDING THE
OVERALL HYDROGEN-TO-HELIUM RATIO, AND DARK SIDE TEMPERATURE.
THE INSTRUMENT CONSISTED OF A 7.62-CM (3-IN.) REFLECTING
CASSEGRAIN TELESCOPE WITH A 1-DEG BY 3-DEG FIELD-OF-VIEW THAT
ILLUMINATED A PAIR OF 80-CHANNEL, THIN-FILM BISMUTHIC
THERMOPILES IN TWO BANDS OF THE IR SPECTRUM (14 TO 25 MICRONS
AND 19 TO 56 MICRONS) TO MEASURE THE IRRADIANCE. THE
TWO-CHANNEL RADIOMETER WAS SIMILAR TO THOSE FLOWN ON MARINER 4
AND 6, BUT WAS MORE ACCURATE AND HAD BETTER SPATIAL
RESOLUTION.

----- PIONEER 11, NESS -----

EXPERIMENT NAME- JOVIAN MAGNETIC FIELD

NSSDC ID- 73-019A-14

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - N.F. NESSNASA-GSFC
GREENBELT, MD

OI - M.H. ACUNANASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS TRIAXIAL FLUXGATE MAGNETOMETER WAS DESIGNED TO
STUDY THE JOVIAN MAGNETIC FIELD. EACH SENSOR OPERATED IN THE
RANGE 0.01- TO 10-GAUSS, WITH 0.1 PERCENT DIGITIZATION
ACCURACY. ONE VECTOR MEASUREMENT WAS OBTAINED EACH 36 SEC.

----- PIONEER 11, SIMPSON -----

EXPERIMENT NAME- CHARGED PARTICLE COMPOSITION

NSSDC ID- 73-019A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.A. SIMPSONU OF CHICAGO
CHICAGO, IL

OI - J.J. O'GALLAGHERU OF MARYLAND
COLLEGE PARK, MD

OI - A. TUZZOLINOU OF CHICAGO
CHICAGO, IL

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO MEASURE CHARGE
COMPOSITION USING THREE TYPES OF DETECTORS -- (1) A 7-ELEMENT
SOLID-STATE DETECTOR TELESCOPE, (2) A HIGH-ENERGY ELECTRON

DETECTOR (EGG), AND (3) A HIGH-ENERGY PROTON DETECTOR (FISSION
FOIL). THE FIRST DETECTOR WAS TO MEASURE PROTONS (400 KEV TO
150 MEV), ELECTRONS (200 KEV TO 30 MEV), AND PARTICLES FROM
H₂ TO O₁₆ (6 TO 150 MEV/NUCLEON). THE SECOND DETECTOR
WAS TO MEASURE BREMSSTRAHLUNG RADIATION FROM ELECTRONS AND
ELECTRONS DIRECTLY (E.G.T. 9 MEV) AND WAS DESIGNED TO EXCLUDE
PROTONS OF ENERGIES LESS THAN 50 MEV. THE THIRD DETECTOR WAS
TO MEASURE PROTONS OF ENERGIES GREATER THAN 50 MEV. THE
DETECTOR SAMPLE TIME WAS TO BE SYNCHRONIZED WITH THE
SPACECRAFT SPIN AND SHOULD BE EQUAL TO 1/6 OF A SPACECRAFT
ROTATION OR ABOUT 1-1/2 SEC.

----- PIONEER 11, SMITH -----

EXPERIMENT NAME- MAGNETIC FIELDS

NSSDC ID- 73-019A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - E.J. SMITHNASA-JPL
PASADENA, CA

OI - D.S. COLBURNNASA-ARC
HOFFETT FIELD, CA

OI - P. DYALNASA-ARC
HOFFETT FIELD, CA

OI - C.P. SONETTU OF ARIZONA
TUCSON, AZ

OI - P.J. COLEMAN, JR.U OF CALIF, LA
LOS ANGELES, CA

OI - L. DAVISCALIF INST OF TECH
PASADENA, CA

OI - D.E. JONESBRIGHAM YOUNG U
PROVO, UT

EXPERIMENT BRIEF DESCRIPTION
THE MAGNETOMETER ON PIONEER 11 IS A TRIAXIAL HELIUM
MAGNETOMETER WITH SEVEN DYNAMIC RANGES, FROM PLUS OR MINUS 2.5
GAUSS TO PLUS OR MINUS 10 GAUSS. THE LINEARITY IS 0.1 PERCENT.
THE NOISE THRESHOLD IS 0.01 GAMMA RMS FOR 0-1 HZ. THE ACCURACY
IS 0.5 PERCENT OF FULL SCALE RANGE.

----- PIONEER 11, SOBERMAN -----

EXPERIMENT NAME- ASTEROID/METEOROID ASTRONOMY

NSSDC ID- 73-019A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.K. SOBERMANDREXEL INST OF TECH
PHILADELPHIA, PA

OI - M.A. ZOOKNASA-JSC
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT SEARCHED FOR PARTICLES WITH MASSES
LARGER THAN ABOUT 1 MICROGRAM BY OBSERVING THE SOLAR LIGHT THE
PARTICLES REFLECT AND SCATTER. FOUR INDEPENDENT TELESCOPIC
SUBSYSTEMS WITH FOUR OVERLAPPING FIELDS OF VIEW WERE USED,
WITH THE ENTRY AND DEPARTURE TIMES OF THE LIGHT FROM THE
PARTICLES BEING USED TO DETERMINE THE RANGE AND VELOCITIES OF
THE PARTICLES THEMSELVES. THE OPTICAL SUBSYSTEMS WERE COMPOSED
OF 8-IN. RITCHIEY-CHretien TELESCOPES WITH A 10-IN. FOCAL
LENGTH AND A 0.2-RAD FIELD OF VIEW.

----- PIONEER 11, VAN ALLEN -----

EXPERIMENT NAME- JOVIAN CHARGED PARTICLES EXPERIMENT

NSSDC ID- 73-019A-11

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.A. VAN ALLENU OF IOWA
IOWA CITY, IA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS DESIGNED TO MEASURE PARTICLES IN THE
VICINITY OF JUPITER USING THREE SETS OF DETECTORS -- (1) A
THREE-ELEMENT GEIGER TUBE TELESCOPE, (2) A THREE-ELEMENT
TRIANGULAR ARRAY OF DETECTORS, AND (3) A LOW-ENERGY GEIGER
TUBE DETECTOR. THE FIRST DETECTOR MEASURED ELECTRONS (E.G.T. 2
MEV) AND PROTONS (E.G.T. 10 MEV). THE SECOND MEASURED
ELECTRONS (E.G.T. 10 MEV), AND THE THIRD ALSO MEASURED
ELECTRONS (E.G.T. 50 KEV). THE DETECTOR SAMPLE TIME WAS
SYNCHRONIZED WITH THE SPACECRAFT TELEMETRY SYSTEM AND DEPENDS
UPON THE TELEMETRY BIT RATE, I.E., THE SAMPLE TIME MAY RANGE
FROM 3/32 SEC TO 12 SEC.

----- PIONEER 11, WEINBERG -----

EXPERIMENT NAME- ZODIACAL-LIGHT TWO-COLOR
PHOTOPOLARIMETRY

NSSDC ID- 73-019A-15

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.L. WEINBERGSTATE U OF NEW YORK
ALBANY, NY

OI - M.S. HANNERSTATE U OF NEW YORK
ALBANY, NY

EXPERIMENT BRIEF DESCRIPTION

THE IMAGING PHOTOPOLARIMETER EXPERIMENT (IPP) WAS USED TO OBTAIN MAPS OF THE ZODIACAL LIGHT DISTRIBUTION IN TWO COLORS, BLUE (3900 TO 4900 Å) AND RED (5000 TO 7000 Å). IN EACH COLOR, THE MAPS WERE CONSTRUCTED OUT OF THE INTEGRATED-DETECTOR-RESPONSE (1/64 OF A ROLL PERIOD), SPIN-SCAN POINT-IMAGING DATA OBTAINED BY VIEWING THROUGH A 40-X 40-MRAD 50 FIELD-STOP APERTURE. THIS WORK WAS PERFORMED DURING THE CRUISE PORTION OF THE MISSION. IN DETAIL, SIMULTANEOUS RADIOMETRIC AND POLARIMETRIC MAPS OF THE SKY IN BOTH COLORS WERE MADE AS THE SPACECRAFT SWEEPED OUT A 360-DEG CLOCK ANGLE SWATH, AND THE TELESCOPE AND OPTICS WERE STEPPED IN CONE ANGLE (THE ANGLE BETWEEN SPACECRAFT SPIN AXIS AND THE TELESCOPE OPTICAL AXIS). AT EACH DISCRETE CONE ANGLE, A 20 ROLL MEASUREMENT CYCLE OCCURRED, CONSISTING OF 10 ROLLS FOR THE ACCUMULATION OF THE DATA AND FOR CALIBRATION, ALTERNATED WITH 10 ROLL PERIODS USED FOR THE TELEMETRY OF THE DATA. DURING A DATA ROLL, THE SIGNALS FROM FOUR DETECTORS (2/COLOR) WERE INTEGRATED OVER A TIME INTERVAL EQUAL TO 1/64 OF THE ROLL PERIOD. THE FOUR CHANNELS PROVIDED SIMULTANEOUS MEASUREMENTS AT TWO ORTHOGONAL POLARIZATION AZIMUTHS IN THE TWO SPECTRAL BANDS. THE POLARIZATION WAS SAMPLED PARALLEL AND PERPENDICULAR TO THE PLANE CONTAINING THE SPACECRAFT SPIN AXIS AND THE OPTICAL AXIS OF THE TELESCOPE. RADIOACTIVE CALIBRATION WAS PROVIDED BY A RADIOISOTOPE-ACTIVATED PHOSPHOR SOURCE. ALL SUCH DATA WERE FORMATTED TO PRODUCE A SKY MAP, 360 DEG IN CLOCK ANGLE BY 141 DEG IN-CONE ANGLE. THE EXPERIMENTAL TRAIN FOR THE IPP PACKAGE CONSISTED OF THE FOLLOWING ELEMENTS -- (1) A NEAR-DIFFRACTION-LIMITED 2.54-CM MAKUSOV CATADIOPTRIC TELESCOPE (F/3.4), (2) A FOCAL PLANE WHEEL CONTAINING FIELD-OF-VIEW APERTURES, DEPOLARIZERS, CALIBRATION SOURCE, ETC., (3) A WOLLASTON PRISM TO SPLIT THE LIGHT INTO TWO ORTHOGONALLY POLARIZED BEAMS, (4) A 45-DEG DICHROMATIC MIRROR THAT REFLECTED WAVELENGTHS LESS THAN 5500 Å (BLUE BEAM) AND TRANSMITTED ALL LIGHT OF GREATER WAVELENGTH (RED BEAM), (5) FOR EACH SPECTRAL BEAM (TWO POLARIZATIONS) A FILTERING-COATED RELAY LENS AND FOLDING MIRRORS, AND (6) FOR EACH SPECTRAL BEAM, TWO SPIN-CHANNEL DETECTORS (BLUE - DIKALCI 5-11 PHOTOCATHODES, RED - S-20 PHOTOCATHODES) TO REGISTER THE INTENSITY IN EACH POLARIZATION COMPONENT. (NOTE-THIS EXPERIMENT WAS ALSO ABOARD PIONEER 10.)

----- PIONEER 11, WOLFE -----

EXPERIMENT NAME- PLASMA EXPERIMENT

NSSDC ID- 73-019A-13

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/06/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. VOLPENASA-ARC
MOFFETT FIELD, CA

OI - L.A. FRANKU OF IOWA
IOWA CITY, IA

OI - R. LUSTMPI
GARCHING, FED REP OF GERMANY

OI - D. INTRILIGATORU OF SOUTHERN CALIF
LOS ANGELES, CA

OI - V.T. ZAVIENTSEFFNASA-ARC
MOFFETT FIELD, CA

OI - L. SMITHNASA-ARC
MOFFETT FIELD, CA

OI - F.L. SCAFTRW SYSTEMS GROUP
REDONDO BEACH, CA

OI - H.H. COLLARDNASA-ARC
MOFFETT FIELD, CA

OI - W.C. FELDMANLOS ALAMOS SCI LAB
LOS ALAMOS, NM

OI - D.D. MCKININNASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

TWO QUADRISPHERICAL ELECTROSTATIC ANALYZERS WERE USED TO STUDY THE DIRECTIONAL INTENSITY OF SOLAR WIND IONS AND ELECTRONS. THE DETECTORS WERE ALSO USED TO OBSERVE A POSSIBLE JOVIAN BOW SHOCK, MAGNETOSHEATH, AND MAGNETOPAUSE. THE INSTRUMENTS WILL STUDY POSITIVE IONS IN 32 ENERGY/CHARGE STEPS BETWEEN 100 V AND 10 KV, AND ELECTRONS IN 16 STEPS BETWEEN 100 V AND 10 KV.

***** PIONEER VENUS ORBITER *****

SPACECRAFT COMMON NAME- PIONEER VENUS ORBITER

ALTERNATE NAMES- PIONEER VENUS 1978 ORBIT

NSSDC ID- P1070R

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- MAY 1978 SPACECRAFT WEIGHT- 517. KG

LAUNCH SITE- CAPE CANAVERAL, UNITED STATES

LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY

UNITED STATES

NASA-DSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- VENUSCENTRIC

ORBIT PERI D- 1440. MIN

PERIAPSIS- 200. KM ALT

INCLINATION- 60. DEG

APOGAIS- 66000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - C.F. HALLNASA-ARC

PS - L. COLINNASA-ARC

MOFFETT FIELD, CA

MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

THE PIONEER VENUS ORBITER IS PLANNED TO BE A SINGLE, SPIN-STABILIZED SPACECRAFT IN A HIGHLY ELLIPTICAL ORBIT ABOUT VENUS. THE NOMINAL OPERATIONAL LIFETIME IS TO BE 1 VENUS SIDEREAL YEAR (225 DAYS), WHICH PERMITS INTENSIVE STUDIES OF THE PLANET'S ATMOSPHERE AND ITS RESPONSES TO THE SUN. THE PAYLOAD HAS BEEN SELECTED TO OPTIMIZE CORRELATIVE STUDIES BETWEEN THE LONG-LIVED ORBITER AND THE ENTRY PROBES. THE ORBITAL INVESTIGATIONS WILL INCLUDE STUDIES OF THE UPPER ATMOSPHERE, IONOSPHERE, AND THE INTERACTIONS OF THE SOLAR WIND WITH THE VENUSIAN ATMOSPHERE. REMOTE SENSING TECHNIQUES WILL EXAMINE THE LOWER ATMOSPHERE AND SURFACE FOR GLOBAL CHARACTERISTICS AND TEMPORAL PHENOMENA OF BOTH SHORT- AND LONG-TERM DURATION. THE LONGEVITY OF THE ORBITER AND THE COMPLETION OF A LARGE NUMBER OF MONITORED ORBITS SHOULD PERMIT A DETERMINATION OF THE GRAVITATIONAL FIELD HARMONICS. IN AN EFFORT TO MINIMIZE COST AND OPTIMIZE DESIGN CAPABILITY, THE ORBITER SPACECRAFT AND THE PROBE BUS FOR THE MULTIPROBE MISSION WILL BE OF COMMON ORIGIN.

----- PIONEER VENUS ORBITER, BRACE -----

EXPERIMENT NAME- LANGMUIR PROBE

NSSDC ID- P1070R-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - L.H. BRACENASA-GSFC

GREENBELT, MD

OI - M.B. MCLEODHARVARD U

CAMBRIDGE, MA

OI - A. PEDERSONPSD-ESTEC

NOTORDWIJK, NETHERLANDS

OI - A.F. NAGYU OF MICHIGAN

ANN ARBOR, MI

OI - T. DONAHUEU OF MICHIGAN

ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A PAIR OF CYLINDRICAL LANGMUIR PROBES OF THE TYPE BEING USED ON AE. TWO PROBES ARE REQUIRED, SO THAT ONE IS ALWAYS OUT OF THE WAKE OF THE SPACECRAFT. IN FLIGHT ANALYSIS, 56 MEASUREMENTS TAKEN AT A RATE OF ONE PER SECOND PROVIDE HIGH SPATIAL RESOLUTION FOR THE MEASUREMENTS OF NE AND TE. THE RESULTS OF THESE HIGH RESOLUTION MEASUREMENTS WILL BE USED BOTH TO STUDY THE UPPER ATMOSPHERE AND IONOSPHERE AND TO INVESTIGATE THE INTERACTION OF THE SOLAR WIND WITH THE VENUSIAN IONOSPHERE. THIS EXPERIMENT WILL PROVIDE MEASUREMENTS OVER THE WHOLE REGION TRAVERSED BY THE ORBITER, COVERING A LARGE RANGE OF SOLAR ASPECT ANGLES, TO YIELD A MORE COMPLETE CONFIGURATION OF THE PHYSICAL PROPERTIES OF THE IONOSPHERE REGION.

----- PIONEER VENUS ORBITER, BROWN -----

EXPERIMENT NAME- RADAR ALTIMETER

NSSDC ID- P1070R-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

TL - W.E. BROWNNASA-JPL

PASADENA, CA

TM - G. PETTINGILLMASS INST OF TECH

CAMBRIDGE, MA

TM - W.H. KAULAU OF CALIF, LA

LOS ANGELES, CA

TM - D.H. STAELINMASS INST OF TECH

CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE A RADAR ALTIMETER TO OBTAIN INFORMATION ON ORBITER ALTITUDE, PLANETARY SURFACE TEMPERATURE, AND RADAR SCATTERING PROPERTIES TO INFER SURFACE TOPOGRAPHY, GEOLOGY, INTERIOR THERMAL, AND MECHANICAL PROPERTIES.

----- PIONEER VENUS ORBITER, CROFT -----

EXPERIMENT NAME- RADIO SCIENCE TEAM

NSSDC ID- P1070R-03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

TL - T.A. CROFTSTANFORD U.
STANFORD, CA
TM - G.H. KEATINGU OF ARIZONA
TUCSON, AZ
TM - A.J. KLIORENASA-JPL
PASADENA, CA
TM - R. PHILLIPSNASA-JPL
PASADENA, CA
TM - I.I. SHAPIROMASS INST OF TECH
CAMBRIDGE, MA
TM - H. WOONASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE RADIO SCIENCE TEAM HAS THE RESPONSIBILITY FOR PLANNING, COORDINATING, AND RECOMMENDING SCIENTIFIC USES OF RADIO SIGNALS, EXECUTING APPROVED EXPERIMENTS, AND CONDUCTING THE DATA ANALYSIS REQUIRED. MAJOR FIELDS OF INTEREST INCLUDE THE GRAVITY FIELD OF VENUS, VERTICAL STRUCTURE OF THE DAYTIME AND NIGHTTIME IONOSPHERES, NEUTRAL ATMOSPHERE TEMPERATURE, PRESSURE AND DENSITY, HORIZONTAL GRADIENTS OF ATMOSPHERIC PROPERTIES, AND SMALL SCALE TURBULENCE IN THE ATMOSPHERE.

----- PIONEER VENUS ORBITER, DONAHUE -----

EXPERIMENT NAME- PARTICIPATING THEORIST DONAHUE

NSDDC ID- P10700R-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.W. DONAHUEU OF MICHIGAN
ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL COMBINE RESULTS OBTAINED FROM THE ORBITER MISSION WITH RESULTS FROM THE MULTIPROBE MISSION TO OBTAIN A UNIFIED PICTURE OF THE ATMOSPHERIC AND IONOSPHERIC CHEMISTRY AND TRANSPORT PROCESSES OCCURRING IN THE ATMOSPHERE OF VENUS.

----- PIONEER VENUS ORBITER, EVANS -----

EXPERIMENT NAME- TRANSIENT GAMMA-RAY SOURCES

NSDDC ID- P10700R-05

LAST REPORTED STATE- APPROVED CONDITIONALLY

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.D. EVANSLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.P. CONNERLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - P.R. HIGGIELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - R.W. KLEBESADELLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - R.A. OLSONLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - I.B. SYRONGLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - R.F. SPALDINGSANDIA LABORATORIES
SANDIA, NM

EXPERIMENT BRIEF DESCRIPTION

AN OMNIDIRECTIONAL GAMMA-RAY DETECTOR EMPLOYING TWO PHOSWICH SCINTILLATION SPECTROMETERS SENSITIVE TO PROTONS FROM 0.2 - 2.0 MEV WILL BE USED WITH LOGIC CIRCUITRY TO DETECT THE BEGINNING OF A GAMMA EVENT AND TO INITIATE A PERIOD OF RAPID DATA COLLECTION. DATA WILL BE STORED IN A MEMORY UNIT FOR SUBSEQUENT TRANSMISSION TO EARTH. CONFIRMATION THAT A TRUE GAMMA EVENT HAS OCCURRED WILL BE OBTAINED BY COMPARISON WITH RESULTS FROM OTHER EXPERIMENTS IN EARTH SATELLITES. THIS EXPERIMENT WILL PROVIDE THE LONG BASELINE TIME CORRELATIONS NECESSARY FOR CALCULATING ACCURATE SOURCE LOCATIONS.

----- PIONEER VENUS ORBITER, HANSEN -----

EXPERIMENT NAME- CLOUD PHOTOPOLARIMETER

NSDDC ID- P10700R-06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J. HANSENU OF ARIZONA
TUCSON, AZ
OI - P. STONENASA-GISS
NEW YORK, NY
OI - A.L. LACISCOMPUTER SCIENCES CORP
NEW YORK, NY
OI - D.L. COFFEENU OF ARIZONA
TUCSON, AZ
OI - L. TRAVISCOMPUTER SCIENCES CORP
NEW YORK, NY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE A SIMPLIFIED VERSION OF THE IMAGING PHOTOPOLARIMETER FLOWN ON PIONEERS 10 AND 11 TO PROVIDE LOW RESOLUTION FOUR-COLOR MAPS OF THE VENUSIAN CLOUD COVER WITH A HIGH RESOLUTION IMAGING CAPABILITY NEAR APOCENTER. THE PRINCIPAL OBJECTIVE OF THIS INVESTIGATION IS TO DETERMINE THE PROPERTIES OF THE CLOUDS AND HAZE, INCLUDING THE VERTICAL AND HORIZONTAL DISTRIBUTION OF THE PARTICLES, CLOUD PARTICLE SIZE AND REFRACTIVE INDEX, THE CLOUD-TOP HEIGHT, AND THE NUMBER DENSITY OF PARTICLES.

----- PIONEER VENUS ORBITER, KNUDSEN -----

EXPERIMENT NAME- RETARDING POTENTIAL ANALYZER

NSDDC ID- P10700R-07

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.C. KNUDSENLOCKHEED PALO ALTO
PALO ALTO, CA
OI - K. SPENNERWGSBR
FREIBURG, FPD REP OF GERMANY
OI - R.C. WHITTENNASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENT PROPOSED FOR THIS EXPERIMENT IS A LANGMUIR PROBE, RETARDING POTENTIAL ANALYZER, DESIGNED TO MEASURE ELECTRON CONCENTRATION AND TEMPERATURE, MAJOR ION CONCENTRATIONS AND TEMPERATURES, ION DRIFT VELOCITIES, AND THE ENERGY DISTRIBUTION FUNCTION OF AMBIENT PHOTOELECTRONS. IT IS AN ADAPTATION OF THE INSTRUMENT FLOWN ON THE GERMAN AEROS SATELLITE IN 1972. EITHER ONE OF TWO SENSOR HEADS MAY BE USED, EACH CONSISTING OF A MULTIGRID CUP AND ELECTROMETER, WHICH CAN OPERATE IN ELECTRON, ION, OR PHOTOELECTRON MODES. INITIATED BY SPACECRAFT ROLL PULSES, THE MEASUREMENTS TAKEN WHEN THE SENSOR AXIS IS CLOSEST TO THE PLASMA FLOW VELOCITY VECTOR ARE TRANSMITTED. THE AIMS OF THE INVESTIGATION ARE TO IMPROVE KNOWLEDGE OF THE IMPORTANT IONIC REACTIONS IN THE VENUSIAN IONOSPHERE, TO STUDY THE PLASMA TRANSPORT PROCESSES TO DETERMINE IF VENUS HAS A POLAR WIND, TO STUDY THE PROCESSES AT THE SOLAR WIND-IONOSPHERE BOUNDARY, AND TO STUDY SIMILAR AIMS CONCERNING THE AMBIENT ELECTRON POPULATION.

----- PIONEER VENUS ORBITER, MASURSKY -----

EXPERIMENT NAME- PARTICIPATING THEORIST MASURSKY

NSDDC ID- P10700R-08

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H. MASURSKYUS GEOLOGICAL SURVEY
FLAGSTAFF, AZ

EXPERIMENT BRIEF DESCRIPTION

SURFACE PROFILE, ROUGHNESS, AND ELECTRICAL PROPERTIES DATA FROM THE PIONEER VENUS RADAR ALTIMETER WILL BE ANALYZED IN CONJUNCTION WITH SPACECRAFT-DERIVED GRAVITY INFORMATION AND EARTH-BASED RADAR BACKSCATTER DATA TO PRODUCE A SERIES OF CARTOGRAPHIC AND GEOLOGIC MAPS. THE INITIAL MAPS WILL INCLUDE GEOMETRIC ARRAYS OF RADAR PROFILES AND TOPOGRAPHIC CONTOUR DATA. THESE WILL THEN BE UTILIZED TO PRODUCE A SHADED RELIEF CARTOGRAPHIC MAP, 1 TO 25 MILLION, WITH SUPERIMPOSED CONTOUR INFORMATION. PRELIMINARY VENUSIAN GEOLOGIC INFORMATION, INFERRED FROM ALL AVAILABLE SPACECRAFT AND EARTH-BASED RADAR DATA SOURCES, WILL SUBSEQUENTLY BE ADDED TO THE CARTOGRAPHIC MAP BASE TO PRODUCE GEOLOGIC MAPS. IT IS ANTICIPATED THAT ONE TO THREE LARGER SCALE (1 TO 5 MILLION) CARTOGRAPHIC AND GEOLOGIC MAPS OF SCIENTIFICALLY INTERESTING VENUS SURFACE FEATURES ALSO WILL BE PRODUCED.

----- PIONEER VENUS ORBITER, MCGILL -----

EXPERIMENT NAME- PARTICIPATING THEORIST MCGILL

NSDDC ID- P10700R-09

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.E. MCGILLU OF MASSACHUSETTS
AMHERST, MA

EXPERIMENT BRIEF DESCRIPTION

INVESTIGATIONS OF THE TOPOGRAPHY AND GEOLOGY OF VENUS WILL BE UNDERTAKEN TO ASSURE CORRECT RECOGNITION OF TOPOGRAPHIC AND MATERIAL CHARACTERISTICS OF THE PLANET AND TO ARRIVE AT THE GEOLOGICAL AND GEOPHYSICAL INTERPRETATION OF THESE CHARACTERISTICS.

----- PIONEER VENUS ORBITER, NAGY -----

EXPERIMENT NAME- PARTICIPATING THEORIST NAGY

NSDDC ID- P10700R-10

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)
PI - A.F. NAGYU OF MICHIGAN
ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION
INVESTIGATIONS OF THE IONOSPHERE OF VENUS WILL BE OPTIMIZED BY EXTENDING CURRENT MODELS AND FORMULATING A MISSION PLAN BEST SUITED TO ADDRESS TOPICS INCLUDING THE PHYSICS OF THE SOLAR WIND-IONOSPHERE INTERACTION, ENERGISTICS OF THE UPPER ATMOSPHERE, ION CHEMISTRY, AND THE PROCESSES RESPONSIBLE FOR THE GENERAL STRUCTURE OF THE IONOSPHERE, INCLUDING MECHANISMS RESPONSIBLE FOR THE MAINTENANCE OF THE NIGHTTIME IONOSPHERE.

----- PIONEER VENUS ORBITER, NIEMANN -----

EXPERIMENT NAME- NEUTRAL PARTICLE, MASS SPECTROMETER

NSSDC ID- P10700R-11

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - H.B. NIEMANNNASA-GSFC
GREENBELT, MD
OI - G.R. CARIGNANU OF MICHIGAN
ANN ARBOR, MI
OI - R.E. HARTLENASA-GSFC
GREENBELT, MD
OI - N.W. SPENCERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THE EXPERIMENT WILL USE A QUADRUPOLE MASS SPECTROMETER WITH THREE ION SOURCE OPERATING MODES AND THREE MASS SCANNING MODES. THE ION SOURCE CAN BE OPERATED ALTERNATELY IN OPEN AND CLOSED CONFIGURATIONS TO INCREASE ACCURACY. AN ADAPTIVE MASS SCAN WILL BE USED TO REDUCE THE DUTY RATE REQUIRED FOR A GIVEN INFORMATION RETURN RATE. THE RESOLUTION WILL BE 10^{-4} FOR ADJACENT MASSES, AND THE MASS RANGE 1 TO 45 AMU. VERTICAL AND HORIZONTAL DENSITY VARIATIONS OF THE MAJOR NEUTRAL CONSTITUENTS OF THE UPPER ATMOSPHERE OF VENUS WILL BE DETECTED AND MEASURED TO DEFINE THE DYNAMIC, CHEMICAL, AND THERMAL STATES OF THE UPPER ATMOSPHERE. IMPORTANT CONSTITUENTS TO BE MEASURED ARE H^+ , O^+ , O_2^+ , CO_2^+ AND/OR N_2^+ , AND A^+ . IT MAY ALSO BE POSSIBLE TO STUDY H , O AND/OR H_2 , C , H , AND NO .

----- PIONEER VENUS ORBITER, RUSSELL -----

EXPERIMENT NAME- TRIAXIAL FLUXGATE MAGNETOMETER

NSSDC ID- P10700R-12

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - C.T. RUSSELLU OF CALIF, LA
LOS ANGELES, CA
OI - P.J. COLEMAN, JR.U OF CALIF, LA
LOS ANGELES, CA
OI - F.V. CORDONIU OF CALIF, LA
LOS ANGELES, CA
OI - C.F. KENNELU OF CALIF, LA
LOS ANGELES, CA
OI - R.L. McPHERSONU OF CALIF, LA
LOS ANGELES, CA
OI - G.L. SISCONEU OF CALIF, LA
LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL USE A TRIAXIAL FLUXGATE MAGNETOMETER WITH TWO RING CORE SENSORS AT THE END OF A MAGNETOMETER BOOM AND ONE RING CORE SENSOR, AT 45 DEG TO THE SPIN AXIS, HALFWAY DOWN THE BOOM. THE DRIVE AND ELECTRONICS DESIGN HAS BEEN USED ON THE APOLLO 15 AND 16 SUBSATELLITES. THE OBJECTIVES ARE TO DETERMINE ANY PLANETARY AND REMANENT MAGNETIC FIELDS, TO DEDUCE THE LOCATION AND STRENGTH OF IONOSPHERIC CURRENT SYSTEMS, TO DETERMINE THE ENERGY AND MASS BALANCE IN THE UPPER ATMOSPHERE OF VENUS, TO DETERMINE THE NATURE OF THE SOLAR WIND INTERACTION WITH VENUS, AND TO STUDY THE NEAR-WAKE REGION OF VENUS AND THE STRUCTURE OF THE BOOM SHOCK. INTERPLANETARY OBJECTIVES ARE TO DETERMINE THE PERTURBATION OF THE NEAR-PLANET REGION BY VENUS AND TO COMPARE THE PROPERTIES OF THE AVERAGE FIELD AT 0.7 AND 1.0 AU. THE INSTRUMENT IS INTENDED TO, IN THE WORST CASE OF LOW-DUTY AND LOW-SAMPLE RATES MEASURE ONE VECTOR PER 32 SEC. WHILE IN VENETIAN ORBIT. WHEN THE SPACECRAFT IS COASTING THROUGH THE INTERPLANETARY REGION IN THE APDAPSIS MODE, THE SAMPLE RATE IS PLANNED TO BE ONE VECTOR PER 8 SEC. WHILE THE SPACECRAFT IS PASSING THROUGH THE VENETIAN IONOSPHERE IN THE PERIAPSIS MODE, THE SAMPLE RATE WILL BE FOUR VECTORS PER SEC.

----- PIONEER VENUS ORBITER, SCARF -----

EXPERIMENT NAME- ELECTRIC FIELD DETECTOR

NSSDC ID- P10700R-13

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - F.L. SCARFTRW SYSTEMS GROUP
REDONDO BEACH, CA
OI - I.M. GREENTRW SYSTEMS GROUP
REDONDO BEACH, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A MODIFIED VERSION OF THE PIONEER 8 AND PIONEER 9 EXPERIMENTS TO MEASURE THE ELECTRIC FIELD COMPONENTS IN FOUR 30 PERCENT NARROW BAND CHANNELS CENTERED AT 100, 730, 7350, AND 30,000 HZ. THE AIMS OF THE INVESTIGATION ARE TO PERFORM THE FIRST ANALYSIS OF VLF ELECTRIC FIELDS AT VENUS TO ELUCIDATE THE PLASMA INTERACTIONS BETWEEN THE SOLAR WIND AND THE IONOSPHERIC OR EXOSPHERIC PLASMA. THE ROLE OF PLASMA INSTABILITIES IN MODIFYING THE HEATFLUX FROM THE SOLAR WIND AND IN THERMALIZING NEWLY BORN IONS FROM VENUS WILL ALSO BE STUDIED. A SELF-CONTAINED BALANCED V-TYPE ANTENNA WILL BE USED WITH A DIFFERENTIAL PREAMPLIFIER TO MAKE THE MEASUREMENTS. AT THE 512-DIT-PER-SEC SATELLITE MODE, ONE FREQUENCY SCAN PER SECOND WILL BE MEASURED.

----- PIONEER VENUS ORBITER, SCHUBERT -----

EXPERIMENT NAME- PARTICIPATING THEORIST SCHUBERT

NSSDC ID- P10700R-14

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - G. SCHUBERTU OF CALIF, LA
LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

MEASUREMENTS OF PLASMA TEMPERATURES, MAGNETIC FIELDS, COMPOSITION, AND OTHER DATA WILL BE USED TO DEVELOP AND TEST THEORIES OF ATMOSPHERIC CIRCULATION AND SOLAR WIND-IONOSPHERE INTERACTIONS. IN THE CASE OF THE TOPOGRAPHY AND GRAVITY, THE DATA (ALTIMETRY AND TRAVELING) WILL BE USED BOTH IN DESCRIPTIVE FASHION, TO SIMPLY CHARACTERIZE THE SURFACE OF VENUS AND ITS GRAVITATIONAL FIELD, AND IN A MORE QUANTITATIVE WAY TO MODEL THE INTERNAL STRUCTURE OF THE PLANET.

----- PIONEER VENUS ORBITER, STEWART -----

EXPERIMENT NAME- PROGRAMMABLE ULTRAVIOLET SPECTROMETER

NSSDC ID- P10700R-15

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - A.I. STEWARTU OF COLORADO
BOULDER, CO
OI - C.A. BARTHU OF COLORADO
BOULDER, CO
OI - C.W. FORDU OF COLORADO
BOULDER, CO
OI - G.E. THOMASU OF COLORADO
BOULDER, CO
OI - J.G. ANDERSONU OF COLORADO
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL USE A 125-MM CASSEGRAIN TELESCOPE ON A 125-MM EBERT-FASTIE SPECTROMETER WITH A PROGRAMMABLE GRATING DRIVE. AIRGLOW, SCATTERED SUNLIGHT, AND HYDROGEN LYMAN ALPHA EMISSIONS WILL BE DETECTED IN THE THERMOSPHERE, MESOSPHERE, AND EXOSPHERE OF VENUS. THESE MEASUREMENTS WILL BE USED TO ESTABLISH AND MAP THE COMPOSITION, TEMPERATURE, AND PHOTOCHEMISTRY OF THE THERMOSPHERE AND IONOSPHERE, TO DETERMINE THE PRESSURE AT AND ABOVE THE VISIBLE CLOUD TOPS, AND TO ESTABLISH THE DISTRIBUTION AND ESCAPE RATE OF ATOMIC HYDROGEN. THE INSTRUMENT OPERATES IN THE 1100-3400 A REGION.

----- PIONEER VENUS ORBITER, TAYLOR -----

EXPERIMENT NAME- RADIOMETRIC TEMPERATURE SOUNDING
EXPERIMENT

NSSDC ID- P10700R-16

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TH=TEAM MEMBER)

PI - F.W. TAYLORNASA-JPL
PASADENA, CA
OI - H.H. AUMANNNASA-JPL
PASADENA, CA
OI - M.T. CHAHINENASA-JPL
PASADENA, CA
OI - C.D. FARNERNASA-JPL
PASADENA, CA
OI - J.V. HARTONCHIKNASA-JPL
PASADENA, CA

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

OI - A.P. INGERSOLLCALIF INST OF TECH
 PASADENA, CA
 OI - J.T. HOUGHTONOXFORD U
 OXFORD, ENGLAND
 OI - G.D. PESKETTOXFORD U
 OXFORD, ENGLAND
 OI - C.D. RODGERSOXFORD U
 OXFORD, ENGLAND
 OI - E.J. WILLIAMSONOXFORD U
 OXFORD, ENGLAND
 OI - R. DICKINSONNATL CTR FOR ATMOS RES
 BOULDER, CO
 OI - J.C. GILLENATL CTR FOR ATMOS RES
 BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS INVESTIGATION WILL USE AN EIGHT-CHANNEL RADIONETER FOR VERTICAL TEMPERATURE SOUNDING OF THE ATMOSPHERE FROM THE CLOUD TOPS (60 KM) TO 150 KM AND FOR INVESTIGATIONS OF CLOUD MORPHOLOGY, INCLUDING THE IDENTIFICATION OF POSSIBLE MULTIPLE LAYERS AND WATER VAPOR MAPPING. THE INSTRUMENT IS BASED ON THE SELECTIVE CHOPPER RADIONETER AND THE PRESSURE MODULATOR RADIONETER DESIGNS FLOWN ON NIMBUS SATELLITES.

----- PIONEER VENUS ORBITER, TAYLOR, JR. -----

EXPERIMENT NAME- ION MASS SPECTROMETER

NSSOC ID- PI0780C-17

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.A. TAYLOR, JR.NASA-GSFC
 GREENBELT, MD
 OI - S.J. DAUERNASA-GSFC
 GREENBELT, MD
 OI - R.E. HARTLENASA-GSFC
 GREENBELT, MD
 OI - H.C. ORINTONNASA-GSFC
 GREENBELT, MD
 OI - J.R. HERMANNASA-GSFC
 GREENBELT, MD
 OI - T.M. DONAHUEU OF MICHIGAN
 ANN ARBOR, MI
 OI - P.A. CLOUTIERRICE U
 HOUSTON, TX
 OI - F.C. MICHELRICE U
 HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE COMPOSITION AND CONCENTRATION OF THERMAL POSITIVE IONS IN THE IONOSPHERE OF VENUS WILL BE DETERMINED AND INTERPRETED IN TERMS OF VERTICAL AND HORIZONTAL COMPONENTS. THE INSTRUMENT USED WILL BE A BENNETT RADIO-FREQUENCY MASS SPECTROMETER BASED ON THE DESIGN OF ONES FLOWN ON OGO AND ATMOSPHERIC EXPLORER SATELLITES. A MASS RANGE OF 1 TO 60 AMU WILL BE COVERED WITH A VARIETY OF AUTOMATIC SCAN-SEARCH MODES AVAILABLE.

----- PIONEER VENUS ORBITER, WOLFE -----

EXPERIMENT NAME- SOLAR WIND PLASMA DETECTOR

NSSOC ID- PI0780R-18

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.H. WOLFENASA-ARC
 HOFFETT FIELD, CA
 OI - A. DARNESNASA-ARC
 HOFFETT FIELD, CA
 OI - H.R. COLLARDNASA-ARC
 HOFFETT FIELD, CA
 OI - D.D. MCKIDDINNASA-ARC
 HOFFETT FIELD, CA
 OI - J.D. MINALOVNASA-ARC
 HOFFETT FIELD, CA
 OI - R.C. WHITTENNASA-ARC
 HOFFETT FIELD, CA
 OI - D.S. INTRILIGATORU OF SOUTHERN CALIF
 LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENT PROPOSED FOR THIS EXPERIMENT IS A QUADRISPHERICAL ELECTROSTATIC ANALYZER (DETECTOR B OF THE PIONEERS 10-11 PLASMA INSTRUMENT), WITH FIVE CURRENT COLLECTORS AND ELECTROMETERS. THE ENERGY/CHARGE RANGE IS 50-8000 (IONS), 32 STEPS AND 1-500 (ELECTRONS), 16 STEPS. THE ANGULAR RANGE TO BE COVERED IS PLUS OR MINUS 85 DEG ELEVATION BY 360 DEG AZIMUTH, AND THE DETECTOR FIELD OF VIEW IS 15 DEG TIMES 25 DEG OR 15 DEG TIMES 45 DEG, DEPENDING ON POSITION. THE LOGIC DESIGN WILL BE ESSENTIALLY THAT USED ON PIONEERS B AND 9. THE OBJECTIVES ARE TO MEASURE SOLAR WIND CONDITIONS OUTSIDE THE VENUS BOW SHOCK, INSIDE THE MAGNETOSHEATH FLOW FIELD, AND ATTEMPT STUDIES IN THE IONOPAUSE STRUCTURE, SOLAR WIND MEASUREMENTS WILL ALSO BE MADE DURING THE TRANSIT TO VENUS. PARTICULARLY TO STUDY MACROSCALE PROBLEMS AND TO DETERMINE AVERAGE GRADIENTS. THE NEAR-PLANET WAKE REGION WILL BE STUDIED.

***** PIONEER VENUS PROBE BUS *****

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE BUS
 ALTERNATE NAMES- PIONEER VENUS 1978
 NSSOC ID- PI078PA

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 05/00/78
 LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
 LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY
 UNITED STATES NASA-QSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PM - C.P. HALLNASA-ARC
 HOFFETT FIELD, CA
 PS - L. COLINNASA-ARC
 HOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT IS THE BUS PORTION OF THE PIONEER VENUS MULTIPROBE MISSION. ON THIS MISSION FOUR INSTRUMENTED ATMOSPHERIC ENTRY PROBES WILL BE CARRIED BY THIS BUS TO THE VICINITY OF VENUS AND RELEASED FOR DESCENT THROUGH THE ATMOSPHERE TO THE PLANETARY SURFACE. TWO SMALL PROBES WILL ENTER ON THE NIGHTSIDE AND ONE SMALL PROBE AND ONE LARGE PROBE WILL ENTER ON THE DAYSIDE OF THE PLANET. THE SPACECRAFT WILL BE SPIN STABILIZED, AND THE TRIP TO VENUS WILL TAKE 129 DAYS. THE FOUR PROBES WILL SEPARATE FROM THE BUS ABOUT 10 TO 20 DAYS BEFORE ENTRY. THE LARGE PROBE WILL TAKE 1-1/2 HOURS TO DESCEND THROUGH THE ATMOSPHERE, WHILE THE THREE SMALLER PROBES WILL REACH THE SURFACE OF THE PLANET 75 MINUTES AFTER ENTRY. THE BUS PORTION OF THE SPACECRAFT WILL BE TARGETED TO ENTER THE VENUSIAN ATMOSPHERE AT A SHALLOW ENTRY ANGLE AND TRANSMIT DATA TO EARTH UNTIL THE BUS IS DESTROYED BY THE HEAT OF ATMOSPHERIC FRICTION DURING ITS DESCENT. INVESTIGATIONS WILL EMPHASIZE THE STUDY OF THE STRUCTURE AND COMPOSITION OF THE ATMOSPHERE DOWN TO THE SURFACE, THE NATURE AND COMPOSITION OF THE CLOUDS, THE RADIATION FIELD AND ENERGY EXCHANGE IN THE LOWER ATMOSPHERE, AND LOCAL INFORMATION ON THE ATMOSPHERIC CIRCULATION PATTERN. A SISTER MISSION, PIONEER VENUS ORBITER, IS SCHEDULED TO PLACE AN ORBITING SPACECRAFT AROUND VENUS 2 WEEKS BEFORE THE PROBES ARE RELEASED. SIMULTANEOUS MEASUREMENTS BY THE PROBES AND ORBITER WILL PERMIT RELATING SPECIFIC LOCAL MEASUREMENTS TO THE GENERAL STATE OF THE PLANET AND ITS ENVIRONMENT AS OBSERVED FROM ORBIT.

----- PIONEER VENUS PROBE BUS, DAUER -----

EXPERIMENT NAME- PARTICIPATING THEORIST DAUER

NSSOC ID- PI078PA-08

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.J. DAUERNASA-GSFC
 GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF THEORISTS HAVE BEEN SELECTED TO PARTICIPATE AS MEMBERS OF THE SCIENCE STEERING GROUP IN DEFINING THE SCIENTIFIC OBJECTIVES, STRATEGY, AND PLANNING FOR THE MISSION, IN COORDINATING THE EXPERIMENTS, AND IN THE ANALYSIS OF FLIGHT EXPERIMENT DATA. EACH THEORIST HAS AN AREA OF MAJOR RESPONSIBILITY WHICH INCLUDES ANALYSIS AND INTERPRETATION OF THE IN-SITU ION COMPOSITION, ELECTRON DENSITY AND TEMPERATURE, AND NEUTRAL COMPOSITION MEASUREMENTS TO PRODUCE A SELF-CONSISTENT MODEL OF THE DAYSIDE UPPER ATMOSPHERE AND IONOSPHERE OF VENUS, INCLUDING THE ROLE OF CHEMICAL AND TRANSPORT PROCESSES, AS WELL AS AN UNDERSTANDING OF THE TYPE OF INTERACTION BETWEEN THE SOLAR WIND AND THE VENUS IONOSPHERE.

----- PIONEER VENUS PROBE BUS, DONAHUE -----

EXPERIMENT NAME- PARTICIPATING THEORIST DONAHUE

NSSOC ID- PI078PA-09

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.M. DONAHUEU OF MICHIGAN
 ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF THEORISTS HAVE BEEN SELECTED TO PARTICIPATE AS MEMBERS OF THE SCIENCE STEERING GROUP IN DEFINING THE SCIENTIFIC OBJECTIVES, STRATEGY, AND PLANNING FOR THE MISSION, IN COORDINATING THE EXPERIMENTS, AND IN THE ANALYSIS OF FLIGHT EXPERIMENT DATA. EACH THEORIST HAS AN AREA OF MAJOR RESPONSIBILITY WHICH INCLUDES THE INTERDISCIPLINARY ASPECTS OF ATMOSPHERIC CHEMISTRY AND RADIATIVE TRANSPORT THEORY TO ARRIVE AT AN UNDERSTANDING OF THE AERODYNAMICS OF THE ATMOSPHERE OF VENUS.

----- PIONEER VENUS PROBE BUS, GOODY -----

EXPERIMENT NAME- PARTICIPATING THEORIST GOODY

NSDOC ID- PI078PA-10

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.N. GOODYHARVARD U
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF THEORISTS HAVE BEEN SELECTED TO PARTICIPATE AS MEMBERS OF THE SCIENCE STEERING GROUP IN DEFINING THE SCIENTIFIC OBJECTIVES, STRATEGY, AND PLANNING FOR THE MISSION, IN COORDINATING THE EXPERIMENTS, AND IN THE ANALYSIS OF FLIGHT EXPERIMENT DATA. EACH THEORIST HAS AN AREA OF MAJOR RESPONSIBILITY WHICH INCLUDES THE THEORY OF THE CIRCULATION OF THE LOWER ATMOSPHERE AND THE RECOMBINATION OF THE PRODUCTS OF PHOTOLYSIS.

----- PIONEER VENUS PROBE BUS, HUNTEN -----

EXPERIMENT NAME- PARTICIPATING THEORIST HUNTEN

NSDOC ID- PI078PA-11

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.M. HUNTENKITT PEAK NATL OBS
TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF THEORISTS HAVE BEEN SELECTED TO PARTICIPATE AS MEMBERS OF THE SCIENCE STEERING GROUP IN DEFINING THE SCIENTIFIC OBJECTIVES, STRATEGY, AND PLANNING FOR THE MISSION, IN COORDINATING THE EXPERIMENTS, AND IN THE ANALYSIS OF FLIGHT EXPERIMENT DATA. EACH THEORIST HAS AN AREA OF MAJOR RESPONSIBILITY WHICH INCLUDES A DETAILED DESCRIPTION OF THE CLOUDS AND THE HEAT BALANCE OF THE ATMOSPHERE AND SURFACE OF VENUS AND A DETERMINATION OF THE DYNAMICS AND AERONOMY OF THE UPPER ATMOSPHERE.

----- PIONEER VENUS PROBE BUS, PETTENGILL -----

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE
INTERFEROMETRIC TRACKING

NSDOC ID- PI078PA-06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G. PETTENGILLMASS INST OF TECH
CAMBRIDGE, MA

OI - I.I. SHAPIROMASS INST OF TECH
CAMBRIDGE, MA
OI - H. PRINNMASS INST OF TECH
CAMBRIDGE, MA
OI - J. CHARNEYMASS INST OF TECH
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) IN ORDER TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED, IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

----- PIONEER VENUS PROBE BUS, PETTENGILL -----

EXPERIMENT NAME- RADIO SCIENCE TEAM

NSDOC ID- PI078PA-07

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
TL - G. PETTENGILLMASS INST OF TECH
CAMBRIDGE, MA
TM - T.A. CROFTSTANFORD U
STANFORD, CA
TM - A.J. KLIDRFNASA-JPL
PASADENA, CA
TM - R. WOODNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE RADIO SCIENCE TEAM SHALL HAVE THE RESPONSIBILITY FOR PLANNING, COORDINATING, AND RECOMMENDING SCIENTIFIC USES OF RADIO SIGNALS FOR THE MISSION, AND OF EXECUTING APPROVED EXPERIMENTS AND CONDUCTING THE DATA ANALYSIS REQUIRED. THE MAJOR AREAS OF RESPONSIBILITY WILL BE IN THE USE OF S-BAND TELEMETRY SIGNALS TO OBTAIN PRECISE TRAJECTORY AND DESCENT

DATA OF THE ENTRY PROOBS FOR DETERMINATION OF ATMOSPHERIC MOTIONS, WINDS, AND TURBULENCE. ALSO, THE TEAM WILL BE RESPONSIBLE FOR THE DEVELOPMENT AND ANALYSIS OF RECOMMENDATIONS PERTAINING TO THE APPLICATIONS OF VERY LONG BASELINE INTERFEROMETRY TECHNIQUES TO THE MISSION.

----- PIONEER VENUS PROBE BUS, POLLACK -----

EXPERIMENT NAME- PARTICIPATING THEORIST POLLACK

NSDOC ID- PI078PA-12

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.B. POLLACKNASA-ARC
MOFFEY FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF THEORISTS HAVE BEEN SELECTED TO PARTICIPATE AS MEMBERS OF THE SCIENCE STEERING GROUP IN DEFINING THE SCIENTIFIC OBJECTIVES, STRATEGY, AND PLANNING FOR THE MISSION, IN COORDINATING THE EXPERIMENTS, AND IN THE ANALYSIS OF FLIGHT EXPERIMENT DATA. EACH THEORIST HAS AN AREA OF MAJOR RESPONSIBILITY WHICH INCLUDES THE DETERMINATION OF IMPORTANT SOURCES OF THERMAL OPACITY, THE SCATTERING CHARACTERISTICS OF THE CLOUDS, AND SOLAR ENERGY DEPOSITION PROFILE, AND THE THEORY AND EVOLUTION OF THE ATMOSPHERE AND LITHOSPHERE OF VENUS.

----- PIONEER VENUS PROBE BUS, SPENCER -----

EXPERIMENT NAME- PARTICIPATING THEORIST SPENCER

NSDOC ID- PI078PA-13

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - N.W. SPENCERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF THEORISTS HAVE BEEN SELECTED TO PARTICIPATE AS MEMBERS OF THE SCIENCE STEERING GROUP IN DEFINING THE SCIENTIFIC OBJECTIVES, STRATEGY, AND PLANNING FOR THE MISSION, IN COORDINATING THE EXPERIMENTS, AND IN THE ANALYSIS OF FLIGHT EXPERIMENT DATA. EACH THEORIST HAS AN AREA OF MAJOR RESPONSIBILITY WHICH INCLUDES THE INTERDISCIPLINARY ASPECTS OF THE NATURE OF THE COMPOSITION OF THE ATMOSPHERE OF VENUS, THE NATURE AND COMPOSITION OF THE CLOUDS IN THE ATMOSPHERE, AND THE DRIVING FORCES OR ENERGY INPUTS AFFECTING THE BEHAVIOR OF THE ATMOSPHERE AND CLOUDS AND CHANGES WHICH TAKE PLACE.

----- PIONEER VENUS PROBE BUS, TAYLOR, JR. -----

EXPERIMENT NAME- ION MASS SPECTROMETER

NSDOC ID- PI078PA-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - H.A. TAYLOR, JR.NASA-GSFC
GREENBELT, MD

OI - S.J. BAUERNASA-GSFC
GREENBELT, MD
OI - T.M. DONAHUEU OF MICHIGAN
ANN ARBOR, MI
OI - P.A. CLOUTIERRICE U
HOUSTON, TX
OI - R.C. HARTLENASA-GSFC
GREENBELT, MD
OI - H.C. BRINTONNASA-GSFC
GREENBELT, MD
OI - F.C. MICHELRICE U
HOUSTON, TX

EXPERIMENT BRIEF DESCRIPTION

THIS ION MASS SPECTROMETER EXPERIMENT WILL OBTAIN MEASUREMENTS WHICH WILL PROVIDE INFORMATION ON THE SOLAR WIND INTERACTION WITH VENUS, UPPER ATMOSPHERE PHOTOCHEMISTRY, AND THE MASS AND HEAT TRANSPORT CHARACTERISTICS OF THE ATMOSPHERE. A BENNETT ION SPECTROMETER, SIMILAR TO UNITS FLOWN ON MANY EARTH SATELLITES AND ROCKETS, WILL MEASURE VENUS' UPPER ATMOSPHERE ION CONCENTRATIONS IN THE MASS RANGE FROM 1 TO 60 ATOMIC MASS UNITS (AMU) FROM THE TIME OF CROSSING VENUS' BOWSHOCK TO BUS TURNUP.

----- PIONEER VENUS PROBE BUS, VON ZAHN -----

EXPERIMENT NAME- NEUTRAL PARTICLE MASS SPECTROMETER

NSDOC ID- PI078PA-03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - U. VON ZAHNU OF BONN
BONN, FED REP OF GERMANY

01 - A.O. CANTERU OF MINNESOTA
MINNEAPOLIS, MN
01 - D.H. HUNTENKIT PRAK NATL ODS
TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THIS NEUTRAL PARTICLE MASS SPECTROMETER EXPERIMENT WILL OBTAIN MEASUREMENTS WHICH WILL PROVIDE INFORMATION ON THE ORIGIN AND EVOLUTION OF VENUS' ATMOSPHERE, THE PRESENT ENERGY BALANCE AND DYNAMICS OF THE UPPER ATMOSPHERE, AND THE INTERACTION OF THE UPPER ATMOSPHERE WITH SOLAR RADIATION AND THE INTERPLANETARY MEDIUM. A MAGNETIC DEFLECTION, DOUBLE-FOCUSING MASS SPECTROMETER WILL BE FLOWN TO MEASURE THE UPPER ATMOSPHERE NEUTRAL MOLECULES IN THE MASS RANGE 1 TO 46 ATOMIC MASS UNITS.

***** PIONEER VENUS PROBE LRG *****

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE LRG
ALTERNATE NAMES- PIONEER VENUS 1978
NSSDC ID- P1078PB

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT- 300. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALLNASA-ARC
HOFFETT FIELD, CA
PS - L. COLINNASA-ARC
HOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT IS THE LARGE PROBE PORTION OF THE PIONEER VENUS MULTIPROBE MISSION. ON THIS MISSION FOUR INSTRUMENTED ATMOSPHERIC ENTRY PROBES WILL BE CARRIED BY A SPACECRAFT BUS TO THE VICINITY OF VENUS AND RELEASED FOR DESCENT THROUGH THE ATMOSPHERE TO THE PLANETARY SURFACE. TWO SMALL PROBES WILL ENTER ON THE NIGHTSIDE AND A SMALL PROBE AND THIS LARGE PROBE WILL ENTER ON THE DAYSIDE OF THE PLANET. THE SPACECRAFT BUS WILL ENTER THE ATMOSPHERE AND OBTAIN ATMOSPHERIC COMPOSITION DATA UNTIL BURNUP. INVESTIGATIONS WILL EMPHASIZE THE STUDY OF THE STRUCTURE AND COMPOSITION OF THE ATMOSPHERE DOWN TO THE SURFACE, THE NATURE AND COMPOSITION OF THE CLOUDS, THE RADIATION FIELD AND ENERGY EXCHANGE IN THE LOWER ATMOSPHERE, AND LOCAL INFORMATION ON THE ATMOSPHERIC CIRCULATION PATTERN. A SISTER MISSION, PIONEER VENUS ORBITER, IS SCHEDULED TO PLACE AN ORBITING SPACECRAFT AROUND VENUS TWO WEEKS BEFORE THE PROBES ARE RELEASED. SIMULTANEOUS MEASUREMENTS BY THE PROBES AND ORBITER WILL PERMIT RELATING SPECIFIC LOCAL MEASUREMENTS TO THE GENERAL STATE OF THE PLANET AND ITS ENVIRONMENT AS OBSERVED FROM ORBIT.

----- PIONEER VENUS PROBE LRG, DOESE -----

EXPERIMENT NAME- INFRARED RADIOMETER

NSSDC ID- P1078PB-05

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.W. DOESENASA-ARC
HOFFETT FIELD, CA
OI - J.D. POLLACKNASA-ARC
HOFFETT FIELD, CA
OI - J.H. MILLERNASA-ARC
HOFFETT FIELD, CA
OI - L.P. GIVERNASA-ARC
HOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT ARE TO MEASURE THE ATMOSPHERE THERMAL FLUX PROFILE, DETECT CLOUD LAYERS AND INFER THEIR COMPOSITION, AND ESTIMATE THE ATMOSPHERIC WATER VAPOR CONTENT. THIS EXPERIMENT WILL USE A 4-CHANNEL INFRARED RADIOMETER LOOKING DOWN FROM THE PROBE. TWO INTERNAL BLACKBODIES WILL BE USED TO ALLOW ABSOLUTE MEASUREMENTS OF THE FLUX IN EACH CHANNEL. THE INSTRUMENT WILL WEIGH ABOUT 2 KG AND WILL USE ABOUT 3 W OF POWER.

----- PIONEER VENUS PROBE LRG, HOFFMAN -----

EXPERIMENT NAME- NEUTRAL PARTICLE MASS SPECTROMETER

NSSDC ID- P1078PB-06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.H. HOFFMANU OF TEXAS, DALLAS
DALLAS, TX
OI - R. HODGESU OF TEXAS, DALLAS
DALLAS, TX
OI - M. KOLPINTRW SYSTEMS GROUP
REDWOOD BEACH, CA
OI - H.D. MCLEODHARVARD U
CAMBRIDGE, MA

01 - T.M. DONAHUEU OF MICHIGAN
ANN ARBOR, MI

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS INVESTIGATION IS TO MEASURE THE COMPOSITION OF THE LOWER ATMOSPHERE OF VENUS. THIS INVESTIGATION WILL USE A CERAMIC MICRO LEAK GAS INLET AND A DOUBLE FOCUSING MAGNETIC DEFLECTION MASS SPECTROMETER. ABOUT 50 ANALYSES OF THE VENUSIAN ATMOSPHERE WILL BE MADE DURING THE PROBE DESCENT. A SEPARATE SAMPLE OF THE ATMOSPHERE WILL BE ANALYZED FOR RARE GASES. THE ANALYZER WILL HAVE A MASS RANGE OF 1 - 212 AMU AND A DYNAMIC RANGE OF 1E7. THE INSTRUMENT IS BASED ON A DESIGN FLOWN ON THE APOLLO 15 AND 16 COMMAND MODULE. THE WEIGHT WILL BE ABOUT 9 KG AND POWER CONSUMPTION WILL BE ABOUT 12 W.

----- PIONEER VENUS PROBE LRG, KNOLLENBERG -----

EXPERIMENT NAME- CLOUD PARTICLE SIZE SPECTROMETER

NSSDC ID- P1078PB-03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R. KNOLLENBERGU OF CHICAGO
CHICAGO, IL
OI - D.H. HUNTENKIT PRAK NATL ODS
TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO MEASURE VENUS' CLOUD PARTICLE SIZES AND CONCENTRATIONS. A LASER WILL BE USED TO ILLUMINATE CLOUD PARTICLES. OPTICAL LENSES WILL IMAGE THE PARTICLE SHADOWS ON ARRAYS OF DETECTORS. THE PARTICLE SHADOWS WILL BE USED TO DETERMINE PARTICLE SIZE AND CONCENTRATION. THE FLIGHT SENSOR WILL BE SIMILAR TO THOSE FLOWN IN AIRCRAFT AND BALLOONS.

----- PIONEER VENUS PROBE LRG, OYAMA -----

EXPERIMENT NAME- GAS CHROMATOGRAPH

NSSDC ID- P1078PB-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - V.I. OYAMANASA-ARC
HOFFETT FIELD, CA
OI - J.R. POLLACKNASA-ARC
HOFFETT FIELD, CA
OI - G. CARLENASA-ARC
HOFFETT FIELD, CA
OI - F. WOELLERNASA-ARC
HOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS EXPERIMENT WILL BE TO DETERMINE THE COMPOSITION OF VENUS' LOWER ATMOSPHERE. FROM THESE MEASUREMENTS, DEDUCTIONS WILL BE MADE OF THE GASEOUS SOURCES OF INFRARED OPACITY, THE DEGREE OF DIFFERENTIATION OF VENUS' INTERIOR, THE DEGREE OF SIMILARITY BETWEEN THE SOLID BODIES OF EARTH AND VENUS, AND EVOLUTION OF VENUS' ATMOSPHERE. TWO GAS CHROMATOGRAPH COLUMNS WILL BE USED TO ANALYZE SAMPLES OF THE ATMOSPHERE DURING PROBE DESCENT. THREE OR FOUR SAMPLES WILL BE ANALYZED.

----- PIONEER VENUS PROBE LRG, PETTENGILL -----

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE
INTERFEROMETRIC TRACKING

NSSDC ID- P1078PB-09

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

TL - G. PETTENGILLMASS INST OF TECH
CAMBRIDGE, MA
TM - J. CHARNEYMASS INST OF TECH
CAMBRIDGE, MA
TM - I.I. SHAPIROMASS INST OF TECH
CAMBRIDGE, MA
TM - R. PRINNMASS INST OF TECH
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) IN ORDER TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED, IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

----- PIONEER VENUS PROBE LRG. RAGENT -----

EXPERIMENT NAME- CLOUD EXTENT, STRUCTURE, AND
DISTRIBUTION

NSSDC ID- P1078PD-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - B. RAGENTNASA-ARC

OP - J.E. BLAMONTU OF PARIS

PARIS, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DIODE TO ILLUMINATE THE CLOUDS. THE ALTITUDE HISTORY OF THE BACKSCATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORIES. COMPARISONS WITH THE MEASUREMENTS FROM THE SMALL PROBES WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER WILL OPERATE AT ABOUT 9000 A. THE EXPERIMENT WILL WEIGH ABOUT 0.5 KG AND USE ABOUT 1.3 W OF POWER.

----- PIONEER VENUS PROBE LRG. SEIFF -----

EXPERIMENT NAME- ATMOSPHERE STRUCTURE

NSSDC ID- P1078PD-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A. SEIFFNASA-ARC

OI - S. SOMMERNASA-ARC

OI - R. BLANCHARDNASA-LARC

OI - D.B. KIRKNASA-ARC

MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A THREE-AXIS ACCELEROMETER, PRESSURE SENSORS, AND TEMPERATURE SENSORS. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED BY THE PAST VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST RT100-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATIC PROPERTIES FOR THE LARGE PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THEY WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITY, HORIZONTAL WIND VELOCITY, AND TURBULENCE. BY COMPARING ATMOSPHERE CONDITIONS ALONG THE LARGE PROBE TRAJECTORY WITH THOSE MEASURED BY THE SMALL PROBES, CIRCULATION MODELS OF THE ATMOSPHERE WILL BE DETERMINED. THE INSTRUMENTS WILL WEIGH ABOUT 2.5 KG AND WILL CONSUME ABOUT 4.7 W OF POWER.

----- PIONEER VENUS PROBE LRG. TOMASKO -----

EXPERIMENT NAME- SOLAR ENERGY PENETRATION INTO THE
ATMOSPHERE

NSSDC ID- P1078PD-07

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - M.G. TOMASKOU OF ARIZONA

OI - M. KOLFFU OF ARIZONA

OI - A. CLEMENTSU OF ARIZONA

TUCSON, AZ

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVE OF THIS INVESTIGATION WILL BE TO DETERMINE THE REGIONS IN VENUS' ATMOSPHERE WHERE SOLAR ENERGY IS DEPOSITED. SIX NARROW-FIELD-OF-VIEW DETECTORS WILL BE USED TO MEASURE THE INTENSITY OF SCATTERED SOLAR LIGHT. AS THE PROBE DESCENDS THROUGH THE ATMOSPHERE, THE DIFFERENCE BETWEEN UPWARD-LOOKING AND DOWNWARD-LOOKING DETECTORS WILL INDICATE THE NET DOWNWARD FLUX.

***** PIONEER VENUS PROBE SM1 *****

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE SM1

ALTERNATE NAMES- PIONEER VENUS 1978

NSSDC ID- P1078PC

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 05/09/78

LAUNCH SITE- CAPE CANAVERAL, UNITED STATES

LAUNCH VEHICLE- ATLAS-CFNT

SPONSORING COUNTRY/AGENCY

UNITED STATES NASA-OSS

SPACECRAFT WEIGHT- 1.5 KG

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - C.F. HALLNASA-ARC

PS - L. COLINNASA-ARC

MOFFETT FIELD, CA

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE

INTERFEROMETRIC TRACKING

NSSDC ID- P1078PC-03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G. PETTENGILLMASS INST OF TECH

OI - I.I. SHAPIROMASS INST OF TECH

OI - R. PRINNMASS INST OF TECH

OI - J. CHARNEYMASS INST OF TECH

CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) IN ORDER TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED, IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

----- PIONEER VENUS PROBE SM1. RAGENT -----

EXPERIMENT NAME- CLOUD EXTENT, STRUCTURE, AND
DISTRIBUTION

NSSDC ID- P1078PC-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - B. RAGENTNASA-ARC

OP - J.E. BLAMONTU OF PARIS

PARIS, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DIODE TO ILLUMINATE CLOUD PARTICLES. THE ALTITUDE HISTORY OF THE BACKSCATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORY OF EACH PROBE. COMPARISONS OF THE SIGNALS FROM EACH PROBE WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER SIGNAL SOURCE AND DETECTOR WILL OPERATE AT ABOUT 9000 A. THE PACKAGE WILL WEIGH ABOUT 0.6 KG AND WILL USE ABOUT 1.3 W OF POWER.

----- PIONEER VENUS PROBE SM1. SEIFF -----

EXPERIMENT NAME- ATMOSPHERE STRUCTURE

NSSDC ID- P1078PC-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A. SEIFFNASA-ARC

OI - S. SOMMERNASA-ARC

OI - D.B. KIRKNASA-ARC

OI - R. BLANCHARDNASA-LARC

MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A THREE-AXIS ACCELEROMETER, PRESSURE SENSORS, AND TEMPERATURE SENSORS. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED BY THE PAST VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST RT100-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATIC PROPERTIES FOR THE LARGE PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THEY WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITY, HORIZONTAL WIND VELOCITY, AND TURBULENCE. BY COMPARING ATMOSPHERE CONDITIONS ALONG THE LARGE PROBE TRAJECTORY WITH THOSE MEASURED BY THE SMALL PROBES, CIRCULATION MODELS OF THE ATMOSPHERE WILL BE DETERMINED. THE INSTRUMENTS WILL WEIGH ABOUT 2.5 KG AND WILL CONSUME ABOUT 4.7 W OF POWER.

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A SINGLE-AXIS ACCELEROMETER, A PRESSURE SENSOR, AND A TEMPERATURE SENSOR. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED ON THE PAST VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST R7106-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR EACH PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THE MEASUREMENTS WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITIES, HORIZONTAL WIND VELOCITIES, AND TURBULENCE FOR EACH PROBE TRAJECTORY. CIRCULATION MODELS OF THE ATMOSPHERE WILL ALSO BE DRAWN FROM THESE RESULTS. THE INSTRUMENTS WILL WEIGH ABOUT 1 KG AND WILL USE ABOUT 4.0 W OF POWER.

----- PIONEER VENUS PROBE SM1, SUOMI -----

EXPERIMENT NAME- INFRARED RADIOMETER

NSSDC ID- P1078PC-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - V.E. SUOMIU OF WISCONSIN
MADISON, WI
OI - J. LENOBLEU OF LILLE
LILLE, FRANCE
OI - L.A. SROMOVSKYU OF WISCONSIN
MADISON, WI
OI - A. FYMATNASA-JPL
PASADENA, CA
OI - G. DANIELSONNASA-JPL
PASADENA, CA
OI - M. HERMANU OF LILLE
LILLE, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES ARE TO LOCATE REGIONS OF RADIATIVE CONVERGENCE AND DIVERGENCE AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT WILL USE A SMALL NET FLUX RADIOMETER ON THE PROBE, TARGETED TO THE DAYSIDE OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 4 MICRON REGION. THE TWO PROBES TARGETED TO THE NIGHTSIDE OF THE PLANET WILL CARRY NET INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICRON REGION. THE INSTRUMENT WILL WEIGH ABOUT 0.4 KG AND USE 2.2 W OF POWER.

***** PIONEER VENUS PROBE SM2 *****

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE SM2

ALTERNATE NAMES- PIONEER VENUS 1978

NSSDC ID- P1078PD

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT- 75. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - C.F. HALLNASA-ARC
MOFFETT FIELD, CA
PS - L. COLINNASA-ARC
MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT IS THE SECOND SMALL PROBE OF THE PIONEER VENUS MULTIPROBE MISSION. ON THIS MISSION FOUR INSTRUMENTED ATMOSPHERIC ENTRY PROBES WILL BE CARRIED BY A SPACECRAFT BUS TO THE VICINITY OF VENUS AND RELEASED FOR DESCENT THROUGH THE ATMOSPHERE TO THE PLANETARY SURFACE. TWO SMALL PROBES WILL ENTER ON THE NIGHTSIDE, AND ONE SMALL PROBE AND ONE LARGE PROBE WILL ENTER ON THE DAYSIDE OF THE PLANET. THE SPACECRAFT BUS WILL ENTER THE ATMOSPHERE AND OBTAIN ATMOSPHERIC COMPOSITION DATA UNTIL BURNUP. INVESTIGATIONS WILL EMPHASIZE THE STUDY OF THE STRUCTURE AND COMPOSITION OF THE ATMOSPHERE DOWN TO THE SURFACE, THE NATURE AND COMPOSITION OF THE CLOUDS, THE RADIATION FIELD AND ENERGY EXCHANGE IN THE LOWER ATMOSPHERE, AND LOCAL INFORMATION ON THE ATMOSPHERIC CIRCULATION PATTERN. A SISTER MISSION, PIONEER VENUS ORBITER, IS SCHEDULED TO PLACE AN ORBITING SPACECRAFT AROUND VENUS 2 WEEKS BEFORE THE PROBES ARE RELEASED. SIMULTANEOUS MEASUREMENTS BY THE PROBES AND ORBITER WILL PERMIT RELATING SPECIFIC LOCAL MEASUREMENTS TO THE GENERAL STATE OF THE PLANET AND ITS ENVIRONMENT AS OBSERVED FROM ORBIT.

----- PIONEER VENUS PROBE SM2, PETTENGILL -----

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE
INTERFEROMETRIC TRACKING

NSSDC ID- P1078PD-03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G. PETTENGILLMASS INST OF TECH
CAMBRIDGE, MA

OI - I.J. SHAPIROMASS INST OF TECH
CAMBRIDGE, MA
OI - R. PRINNMASS INST OF TECH
CAMBRIDGE, MA
OI - J. CHARNEYMASS INST OF TECH
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED, IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

----- PIONEER VENUS PROBE SM2, RAGENT -----

EXPERIMENT NAME- CLOUD EXTENT, STRUCTURE, AND
DISTRIBUTION

NSSDC ID- P1078PD-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - B. RAGENTNASA-ARC
MOFFETT FIELD, CA
OI - J.F. CLAMONTU OF PARIS
PARIS, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DIODE TO ILLUMINATE CLOUD PARTICLES. THE ALTITUDE HISTORY OF THE BACKSCATTERED SIGNAL WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORY OF EACH PROBE. COMPARISONS OF THE SIGNALS FROM EACH PROBE WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER SIGNAL SOURCE AND DETECTOR WILL OPERATE AT ABOUT 9000 A. THE PACKAGE WILL WEIGH ABOUT 0.6 KG AND WILL USE ABOUT 1.2 W OF POWER.

----- PIONEER VENUS PROBE SM2, SEIFF -----

EXPERIMENT NAME- ATMOSPHERE STRUCTURE

NSSDC ID- P1078PD-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A. SEIFFNASA-ARC
MOFFETT FIELD, CA
OI - S. SOMMERNASA-ARC
MOFFETT FIELD, CA
OI - D.B. KIRKNASA-ARC
MOFFETT FIELD, CA
OI - R. BLANCHARDNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A SINGLE-AXIS ACCELEROMETER, A PRESSURE SENSOR, AND A TEMPERATURE SENSOR. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED ON THE PAST VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST R7106-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERE STATE PROPERTIES FOR EACH PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THE MEASUREMENTS WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITIES, HORIZONTAL WIND VELOCITIES, AND TURBULENCE FOR EACH PROBE TRAJECTORY. CIRCULATION MODELS OF THE ATMOSPHERE WILL ALSO BE DRAWN FROM THESE RESULTS. THE INSTRUMENTS WILL WEIGH ABOUT 1.2 KG AND WILL USE ABOUT 3.4 W OF POWER.

----- PIONEER VENUS PROBE SM2, SUOMI -----

EXPERIMENT NAME- INFRARED RADIOMETER

NSSDC ID- P1078PD-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - V.E. SUOMIU OF WISCONSIN
MADISON, WI
OI - J. LENOBLEU OF LILLE
LILLE, FRANCE
OI - L.A. SROMOVSKYU OF WISCONSIN
MADISON, WI
OI - A. FYMATNASA-JPL
PASADENA, CA
OI - G. DANIELSONNASA-JPL
PASADENA, CA
OI - M. HERMANU OF LILLE
LILLE, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES ARE TO LOCATE REGIONS OF RADIATIVE CONVERGENCE AND DIVERGENCE AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT WILL USE A SMALL NET FLUX RADIOMETER ON THE PROBE TARGETED TO THE DAYSIDE OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 4 MICRON REGION. THE TWO PROBES TARGETED TO THE NIGHTSIDE OF THE PLANET WILL CARRY NET INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICRON REGION. THE INSTRUMENT WILL WEIGH ABOUT 0.4 KG AND USE 2-2 W OF POWER.

***** PIONEER VENUS PROBE SM3 *****

SPACECRAFT COMMON NAME- PIONEER VENUS PROBE SM3
ALTERNATE NAMES- PIONEER VENUS 197H
NSSDC ID- P1070PE

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 05/00/78 SPACECRAFT WEIGHT- 75. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- ATLAS-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PI=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - C.F. HALLNASA-ARC
MOFFETT FIELD, CA
PS - L. COLINNASA-ARC
MOFFETT FIELD, CA

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT IS THE THIRD SMALL PROBE OF THE PIONEER VENUS MULTIPROBE MISSION. ON THIS MISSION FOUR INSTRUMENTED ATMOSPHERIC ENTRY PROBES WILL BE CARRIED BY A SPACECRAFT BUS TO THE VICINITY OF VENUS AND RELEASED FOR DESCENT THROUGH THE ATMOSPHERE TO THE PLANETARY SURFACE. TWO SMALL PROBES WILL ENTER ON THE NIGHTSIDE AND ONE SMALL PROBE AND ONE LARGE PROBE WILL ENTER ON THE DAYSIDE OF THE PLANET. THE SPACECRAFT BUS WILL ENTER THE ATMOSPHERE AND OBTAIN ATMOSPHERIC COMPOSITION DATA UNTIL BURNUP. INVESTIGATIONS WILL EMPHASIZE THE STUDY OF THE STRUCTURE AND COMPOSITION OF THE ATMOSPHERE DOWN TO THE SURFACE, THE NATURE AND COMPOSITION OF THE CLOUDS, THE RADIATION FIELD AND ENERGY EXCHANGE IN THE LOWER ATMOSPHERE, AND LOCAL INFORMATION ON THE ATMOSPHERIC CIRCULATION PATTERN. A SISTER MISSION, PIONEER VENUS ORBITER, IS SCHEDULED TO PLACE AN ORBITING SPACECRAFT AROUND VENUS 2 WEEKS BEFORE THE PROBES ARE RELEASED. SIMULTANEOUS MEASUREMENTS BY THE PROBES AND ORBITER WILL PERMIT RELATING SPECIFIC LOCAL MEASUREMENTS TO THE GENERAL STATE OF THE PLANET AND ITS ENVIRONMENT AS OBSERVED FROM ORBIT.

***** PIONEER VENUS PROBE SM3, PETTENGILL *****

EXPERIMENT NAME- DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING

NSSDC ID- P1070PE-03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G. PETTENGILLMASS INST OF TECH
CAMBRIDGE, MA
DI - I.I. SHAPIROMASS INST OF TECH
CAMBRIDGE, MA
DI - H. PRINNMASS INST OF TECH
CAMBRIDGE, MA
DI - J. CHAPNEYMASS INST OF TECH
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL INVOLVE APPLYING DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRY TECHNIQUES TO THE RADIO SIGNALS FROM THE ENTRY PROBE AND BUS (ORBITING SPACECRAFT) TO INFER OR PLACE UPPER LIMITS ON WIND SPEEDS IN THE LOWER ATMOSPHERE. THESE RESULTS WILL BE USED IN MODELLING THE CIRCULATION PATTERNS OF VENUS' ATMOSPHERE. DATA TAKEN PRIOR TO PROBE ENTRY WILL BE USED, IF FEASIBLE, TO INFER CHARACTERISTICS OF VENUS' GRAVITY FIELD FOR USE WITH PROBE ENTRY OPERATIONS AS WELL AS IN LATER SCIENTIFIC EVALUATION.

***** PIONEER VENUS PROBE SM3, RAGENT *****

EXPERIMENT NAME- CLOUD EXTENT, STRUCTURE, AND DISTRIBUTION

NSSDC ID- P1070PE-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - B. RAGENTNASA-ARC
MOFFETT FIELD, CA
DI - J.C. BLAMONTU OF PARIS
PARIS, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A NEPHELOMETER TO MEASURE THE ENERGY BACKSCATTERED FROM CLOUD PARTICLES. IT WILL USE A PULSED GALLIUM ARSENIDE LASER DIODE TO ILLUMINATE CLOUD PARTICLES. THE ALTITUDE HISTORY OF THE BACKSCATTERED SIGNAL

WILL INDICATE THE PRESENCE AND VERTICAL EXTENT OF CLOUDS ALONG THE TRAJECTORY OF EACH PROBE. COMPARISONS OF THE SIGNALS FROM EACH PROBE WILL INDICATE THE SPATIAL VARIABILITY OF THE CLOUD STRUCTURE. THE LASER SIGNAL SOURCE AND DETECTOR WILL OPERATE AT ABOUT 9000 A. THE PACKAGE WILL WEIGH ABOUT 0.6 KG AND WILL USE ABOUT 1.3 W OF POWER.

***** PIONEER VENUS PROBE SM3, SEIFF *****

EXPERIMENT NAME- ATMOSPHERIC STRUCTURE

NSSDC ID- P1070PE-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - A. SEIFFNASA-ARC
MOFFETT FIELD, CA

DI - S. SOMMERNASA-ARC
MOFFETT FIELD, CA
DI - R. BLANCHARDNASA-ARC
HAMPTON, VA
DI - D.D. KIRKNASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE INSTRUMENTS FOR THIS EXPERIMENT WILL INCLUDE A SINGLE-AXIS ACCELEROMETER, A PRESSURE SENSOR, AND A TEMPERATURE SENSOR. THEY WILL BE BASED ON THE TECHNOLOGY DEMONSTRATED ON THE PAST VEHICLE (PLANETARY ATMOSPHERE EXPERIMENT TEST RT106-2001). THE MEASUREMENTS WILL BE USED TO CONSTRUCT A PROFILE OF ATMOSPHERIC STATE PROPERTIES FOR EACH PROBE TRAJECTORY FROM THE SURFACE TO APPROXIMATELY 140 KM ALTITUDE. THE MEASUREMENTS WILL ALSO BE USED TO DETERMINE VERTICAL WIND VELOCITIES, HORIZONTAL WIND VELOCITIES, AND TURBULENCE FOR EACH PROBE TRAJECTORY. CIRCULATION MODELS OF THE ATMOSPHERE WILL ALSO BE DRAWN FROM THESE RESULTS. THE INSTRUMENTS WILL WEIGH ABOUT 1.2 KG AND WILL USE ABOUT 3.4 W OF POWER.

***** PIONEER VENUS PROBE SM3, SUOMI *****

EXPERIMENT NAME- INFRARED RADIOMETER

NSSDC ID- P1070PE-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - V.E. SUOMIU OF WISCONSIN
MADISON, WI

DI - J. LENOBLEU OF LILLE
LILLE, FRANCE
DI - A. FYMATNASA-JPL
PASADENA, CA
DI - L.A. SRONOVSKYU OF WISCONSIN
MADISON, WI
DI - G. DANIELSONNASA-JPL
PASADENA, CA
DI - M. HERMANU OF LILLE
LILLE, FRANCE

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES ARE TO LOCATE REGIONS OF RADIATIVE CONVERGENCE AND DIVERGENCE AS A FUNCTION OF ALTITUDE AND TO INDICATE THE HEIGHT AT WHICH SOLAR ENERGY IS ABSORBED BY THE ATMOSPHERE. THIS EXPERIMENT WILL USE A SMALL NET FLUX RADIOMETER ON THE PROBE TARGETED TO THE DAYSIDE OF VENUS TO MEASURE THE NET SOLAR FLUX IN THE 0.2 TO 4 MICRON REGION. THE TWO PROBES TARGETED TO THE NIGHTSIDE OF THE PLANET WILL CARRY NET INFRARED FLUX SENSORS COVERING THE 1 TO 25 MICRON REGION. THE INSTRUMENT WILL WEIGH ABOUT 0.4 KG AND USE 2-2 W OF POWER.

***** PIONEER VENUS PROBE SM3, RAE-D *****

SPACECRAFT COMMON NAME- RAE-D
ALTERNATE NAMES- RADIO ASTRONOMY EXPLORER, PL-693D
EXPLORER 49, 0660A
660B

NSSDC ID- 73-039A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 06/10/73.

LAUNCH DATE- 06/10/73 SPACECRAFT WEIGHT- 326. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- LT DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- SELENOCENTRIC
ORBIT PERIOD- 221.17 MIN
PERIAPSIS- 1052.98 KM ALT
EPOCH DATE- 06/21/73
INCLINATION- 38.721 DEG
APOAPSIS- 1063.84 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- SELENOCENTRIC
ORBIT PERIOD- 221.90 MIN
PERIAPSIS- 1052.66 KM ALT
EPOCH DATE- 08/14/74
INCLINATION- 55.340 DEG
APOAPSIS- 1077.02 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.T. SHEANASA-GSFC
GREENBELT, MD
PS - R.G. STONENASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE RAE-B SPACECRAFT MEASURED WITH DIRECTIVITY THE INTENSITY OF CELESTIAL RADIO SOURCES AS A FUNCTION OF TIME, DIRECTION, AND FREQUENCY (0.03 TO 13 MHZ). THREE RAPID-BURST RECEIVERS, TWO RYLE-VONBERG RECEIVERS, AND AN IMPEDANCE PROBE CONNECTED TO TWO 229-M LONG $\frac{1}{4}$ W ANTENNAS AND A 37-M LONG DIPOLE ANTENNA WERE USED. THE SPACECRAFT WAS IN A LUNAR ORBIT ENABLING LUNAR OCCULTATIONS TO BE USED TO DETERMINE CELESTIAL SOURCE POSITIONS FROM A LOCATION FAR REMOVED FROM THE TERRESTRIAL NOISE BACKGROUND.

----- RAE-B, STONE -----
EXPERIMENT NAME- STEP FREQUENCY RADIOMETERS
NSSDC ID- 73-039A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/10/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.G. STONENASA-GSFC
GREENBELT, MD
OI - R.R. WEBERNASA-GSFC
GREENBELT, MD
OI - L. BROWNNASA-GSFC
GREENBELT, MD
OI - J.F. CLARKNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
TWO RYLE-VONBERG RADIOMETERS WERE EACH CONNECTED TO A 229-M, ACUTE ANGLE $\frac{1}{4}$ W ANTENNA. EACH RADIOMETER WAS SUCCESSIVELY TUNED TO NINE DIFFERENT FREQUENCIES IN THE BAND 0.43 TO 9.10 MHZ. PRECISE, AUTOMATIC, AND CONTINUOUS CALIBRATION WAS INHERENT IN THIS TYPE OF DESIGN.

***** RM 20 *****

SPACECRAFT COMMON NAME- RM 20
ALTERNATE NAMES- SESP 73-039A, 51 72-2A
NSSDC ID- RM20

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 030975 SPACECRAFT WEIGHT- 204. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- ATLAS F

SPONSORING COUNTRY/AGENCY
UNITED STATES DOD-USAF

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN INCLINATION- 90. DEG
PERIAPSIS- 750. KM ALT APOAPSIS- 750. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN

PS - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION
THIS SATELLITE WILL BE A LOW-ALTITUDE SATELLITE IN CIRCULAR ORBIT CARRYING FOUR EXPERIMENTS. TWO OF THE EXPERIMENTS WILL STUDY RADIATION FROM THE EARTH HORIZON. A THIRD EXPERIMENT WILL OBSERVE SOLAR EXTINCTION THROUGH THE STRATOSPHERE, AND THE FOURTH WILL STUDY IONOSPHERIC RADIO PROPAGATION. THE SPACECRAFT EXPERIMENT SUPPORT EQUIPMENT WILL INCLUDE A THREE-AXIS STABILIZATION SYSTEM AND A TAPE RECORDER.

----- RM 20, FREMOW -----

EXPERIMENT NAME- TRANSIONOSPHERIC EFFECTS ON WIDEBAND
RADIO SIGNALS

NSSDC ID- RM20 -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - E.J. FREMOWSTANFORD RES INST
MENLO PARK, CA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT IS DESIGNED TO MONITOR (FROM THE GROUND) THE AMPLITUDE AND PHASE SEVERAL PHASE-COHERENT CONTINUOUS-WAVE RADIO SIGNALS. THE PRINCIPAL EXPERIMENTAL EMPHASIS WILL BE ON WIDEBAND PROPAGATION CHARACTERISTICS, SUCH AS SIGNAL DISPERSION AND SCATTERING.

----- RM 20, PEPIN -----

EXPERIMENT NAME- STRATOSPHERIC AEROSOL PROFILE
OBSERVATIONS NEAR SUNRISE/SET

NSSDC ID- RM20 -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.J. PEPINU OF WYOMING
LARAMIE, WY

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO OBSERVE THE SOLAR EXTINCTION PROFILE IN THE NEAR-IR AND BLUE SPECTRAL REGIONS OVER THE EARTH'S TERMINATOR. FROM THESE OBSERVATIONS, AN ANALYSIS OF THE TIME AND SPACE VARIATION OF STRATOSPHERIC AEROSOLS WILL BE MADE. THE DATA WILL ALSO BE STUDIED IN AN ATTEMPT TO DETERMINE SOURCES AND TRANSPORT MECHANISMS.

----- RM 20, UYEMINAMI -----

EXPERIMENT NAME- HORIZON UV RADIANCE PROFILE OBSERVATIONS

NSSDC ID- RM20 -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.T. UYEMINAMIUSAF-SAMSO
LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO STUDY THE EARTH LIND RADIANCE IN THE 900- TO 5000-A RANGE AS A FUNCTION OF ALTITUDE. A PHOTOMULTIPLIER DETECTOR WILL SENSE RADIATION OBSERVED THROUGH A REFLECTING SCANNING OPTICAL SYSTEM. FREQUENCIES WILL BE DETERMINED BY SELECTION FROM FOUR FILTERS MOUNTED ON A WHEEL.

***** S3-2 *****

SPACECRAFT COMMON NAME- S3-2
ALTERNATE NAMES- SESP 573-6
NSSDC ID- S773-6A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 02/00/75 SPACECRAFT WEIGHT- KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE-

SPONSORING COUNTRY/AGENCY
UNITED STATES DOD-USAF

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN INCLINATION- DEG
PERIAPSIS- 230. KM ALT APOAPSIS- 900. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT WILL BE A SPIN-STABILIZED OBSERVATORY MOUNTING 14 SCIENCE EXPERIMENT SENSORS. THE PLANNED POLAR ORBIT (APPROXIMATELY 230 BY 900 KM) WILL COVER A SUFFICIENT VOLUME OF SPACE TO OBSERVE DENSITY CHANGES IN THE LOWER PART OF THE ORBIT AND OTHER PARAMETERS AT HIGHER LEVELS THAT RELATE TO THE DENSITY VARIATIONS. PHYSICAL SHAPE AND OTHER CHARACTERISTICS OF THE SPACECRAFT ARE PRESENTLY UNKNOWN.

----- S3-2, CARTER -----

EXPERIMENT NAME- NEUTRAL DENSITY EXPERIMENT (COLD CATHODE
GAUGE)

NSSDC ID- S773-6A-03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - V.L. CARTERAEROSPACE CORP
EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL STUDY ATMOSPHERIC NEUTRAL DENSITIES AND THEIR LOCALIZED VARIATIONS. THE INSTRUMENT, AFTER REMOVING AMBIENT IONS, WILL IONIZE NEUTRAL PARTICLES BY ELECTRON EMISSION FROM THE CATHODE. THE MEASURED PARAMETER WILL BE THE ION CURRENT TO A COLLECTOR. THE CURRENT WILL RESULT FROM THE IONIZED NEUTRALS AND THE CHARGE ON THE COLLECTOR.

----- S3-2, MARCOS -----

EXPERIMENT NAME- DYNAMICS OF POLAR ATMOSPHERE AND
IONOSPHERE

NSSDC ID- S773-6A-11

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - F.A. MARCOSUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL OBSERVE UPWARD FLUX OF IONS FROM THE POLAR IONOSPHERE. DATA FROM THIS WILL BE USED IN CONJUNCTION WITH MEASUREMENTS OF OTHER POLAR REGION PARAMETERS AND THEIR VARIATIONS, INCLUDING COMPOSITION, CONSTITUENT AND TOTAL DENSITY, ENERGIZED PARTICLE FLUX, ETC. THE OBJECT OF THE STUDY IS TO MORE ACCURATELY DEFINE PRODUCTION, LOSS, AND EQUILIBRIUM PROCESSES WHICH OCCUR WITHIN AND NEAR THE AURORAL OVAL.

----- S3-2, MCISAAC -----

EXPERIMENT NAME- TRIAXIAL PIEZOELECTRIC ACCELEROMETER

NSSDC ID- ST73-6A-10

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.P. MCISAACUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL STUDY ATMOSPHERIC DENSITY AND ITS VARIATIONS IN THE REGION NEAR SATELLITE PERIGEE. THE EXPERIMENT WILL CONSIST OF A CANTILEVERED PYROELECTRIC BEAM LOADED WITH A MASS. ATMOSPHERIC DRAG CHANGES PRODUCING PRESSURE CHANGES IN THE BEAM WILL PRODUCE AN ELECTRIC CURRENT. THE THREE-COMPONENT CURRENT VALUES WILL BE USED TO COMPUTE DENSITY VALUES IN THE ACCELERATING REGIONS OF THE ORBIT.

----- S3-2, MOONEY -----

EXPERIMENT NAME- LOW-ENERGY (1-100 KEV) PARTICLE SPECTROMETER

NSSDC ID- ST73-6A-04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - W. MOONEYUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL EMPLOY AN ELECTROSTATIC ANALYZER TO OBSERVE FLUX, ENERGY SPECTRA, AND DIRECTION OF ELECTRONS AND PROTONS IN THE 1-TO 100-KEV ENERGY RANGE. OBSERVATIONS WILL BE MADE OVER THE ENTIRE ORBIT BETWEEN 200 AND 900 KM. DURING A PERIOD OF INCREASING SOLAR ACTIVITY. THEY WILL BE USED WITH OTHER OBSERVATIONS MADE FROM THIS SPACECRAFT TO HELP DETERMINE CAUSES FOR DENSITY VARIATIONS IN THE NEUTRAL ATMOSPHERE.

----- S3-2, MOONEY -----

EXPERIMENT NAME- PROTON-ALPHA PARTICLE DETECTOR

NSSDC ID- ST73-6A-05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - W. MOONEYUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL OBSERVE PROTONS AND ALPHA PARTICLES BETWEEN 200 AND 900 KM. THESE OBSERVATIONS WILL BE MADE OVER THE ENTIRE ORBIT DURING A PERIOD OF INCREASING SOLAR ACTIVITY. THE RELATIVE EFFECT OF PROTON AND ALPHA PARTICLE VARIATIONS ON NEUTRAL DENSITIES MEASURED FROM THIS SPACECRAFT WILL BE STUDIED.

----- S3-2, MOONEY -----

EXPERIMENT NAME- ENERGETIC ELECTRON (0.1- 1.0 MEV) SENSOR

NSSDC ID- ST73-6A-06

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - W. MOONEYUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - W.A. KOLASINSKIAEROSPACE CORP
LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL EMPLOY AN ELECTROMAGNETIC ANALYZER TO OBSERVE FLUX, ENERGY SPECTRA, AND DIRECTION OF ELECTRONS IN THE 0.1-TO 1.0-MEV ENERGY RANGE. OBSERVATIONS WILL BE MADE OVER THE ENTIRE ORBIT (200 TO 900 KM) DURING A PERIOD OF INCREASING SOLAR ACTIVITY. THEY WILL BE USED WITH OTHER OBSERVATIONS MADE FROM THIS SPACECRAFT TO HELP DETERMINE CAUSES FOR DENSITY VARIATIONS IN THE NEUTRAL ATMOSPHERE.

----- S3-2, PHILBRICK -----

EXPERIMENT NAME- VELOCITY MASS SPECTROMETER

NSSDC ID- ST73-6A-02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.R. PHILBRICKUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL IDENTIFY ATMOSPHERIC CONSTITUENTS AND MEASURE THEIR DENSITIES. AMBIENT IONS WILL BE REMOVED. THE NEUTRALS IONIZED AND THE RESULTING IONS WILL THEN BE MASS SELECTED BY GRID-PRODUCED ELECTROSTATIC FIELDS. THE DIFFERENT IONS WILL BE SEQUENTIALLY SELECTED AND THEN GIVEN A KNOWN ACCELERATION. THE RESULTING TIME-OF-FLIGHT DOWN A DRIFT TUBE WILL IDENTIFY THE ION MASS, AND A COUNTER AT THE END OF THE TUBE WILL OBSERVE THE CONSTITUENT DENSITIES.

----- S3-2, SHIDDY -----

EXPERIMENT NAME- ELECTRIC FIELD OBSERVATIONS

NSSDC ID- ST73-6A-07

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - M. SHIDDYUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE-COMPONENT OBSERVATIONS OF THE IONOSPHERIC ELECTRIC FIELDS ASSOCIATED WITH THE AURORAL ELECTROJET. THESE OBSERVATIONS WILL BE USED IN CONJUNCTION WITH OBSERVATIONS FROM OTHER EXPERIMENTS TO STUDY THE MECHANISMS OF ENERGY FLOW INTO THE AURORAL REGIONS DURING QUIET AND SUBSTORM PERIODS. THE HOPE IS TO CONFIRM THE CONNECTION BETWEEN PREDICTED AURORAL-EVENT ENERGY SOURCES AND TAIL-REGION PARTICLES PREDICTED BY THEORETICAL MODELS.

----- S3-2, SHIDDY -----

EXPERIMENT NAME- MAGNETOMETER

NSSDC ID- ST73-6A-08

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - M. SHIDDYUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE MAGNETIC FIELDS ASSOCIATED WITH THE AURORAL REGION IN QUIET AND SUBSTORM PERIODS. THESE OBSERVATIONS WILL BE USED IN CONJUNCTION WITH OBSERVATIONS FROM OTHER EXPERIMENTS TO STUDY THE MECHANISMS OF ENERGY FLOW INTO THE AURORAL REGIONS DURING QUIET AND SUBSTORM PERIODS. THE HOPE IS TO CONFIRM THE CONNECTION BETWEEN AURORAL-EVENT SOURCES AND TAIL-REGION PARTICLES AS PREDICTED BY THEORETICAL MODELS.

----- S3-2, SHIDDY -----

EXPERIMENT NAME- ELECTROSTATIC ANALYZER

NSSDC ID- ST73-6A-09

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - M. SHIDDYUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL OBSERVE PROTON AND ELECTRON FLUX ASSOCIATED WITH THE AURORAL REGIONS DURING QUIET AND SUBSTORM PERIODS. THESE DATA WILL BE USED IN CONJUNCTION WITH OBSERVATIONS FROM OTHER EXPERIMENTS TO STUDY THE MECHANISMS OF ENERGY FLOW INTO THE AURORAL REGIONS. IT IS HOPED TO CONFIRM THE CONNECTION BETWEEN AURORAL-EVENT ENERGY SOURCES AND TAIL-REGION PARTICLES AS PREDICTED BY THEORETICAL MODELS.

----- S3-2, UNKNOWN -----

EXPERIMENT NAME- NEUTRAL DENSITY EXPERIMENTS (COLD AND HOT CATHODE GAUGES)

NSSDC ID- ST73-6A-01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWNUNKNOWN

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL STUDY NEUTRAL DENSITY VARIATIONS ABOVE 230 KM OVER A WIDE RANGE OF LATITUDE. OF PARTICULAR INTEREST IS THE ASSOCIATION OF THE OBSERVED DENSITY VARIATIONS WITH GEOMAGNETIC AND SOLAR PARAMETERS, TO BETTER IDENTIFY AND INVESTIGATE THE INTERRELATIONSHIPS WHICH OCCURRED. THE FREE IONS WILL BE REMOVED NEAR THE INSTRUMENT APERTURE BY NEGATIVELY CHARGED PLATES. THE NEUTRALS WILL PASS BETWEEN A HOT FILAMENT AND A COLLECTOR, ARRANGED AXIALLY WITHIN A GRID COIL. THE FILAMENT WILL EMIT ELECTRONS AND IONIZE THE NEUTRALS, WHICH WILL THEN (DUE TO THE POSITIVE GRID CHARGE) FORM THE ION CURRENT TO THE COLLECTOR. DENSITIES WILL BE COMPUTED FROM THESE OBSERVED COLLECTOR-CURRENT VALUES. A COLD CATHODE INSTRUMENT WILL ALSO BE INCLUDED IN THIS EXPERIMENT AND WILL OPERATE ON SIMILAR PRINCIPLES.

----- 53-2, WILDMAN -----

EXPERIMENT NAME- ELECTROSTATIC ANALYZER

NSSDC ID- ST73-6A-12

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - P.J.L.WILDMANUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL CONSIST OF AN ELECTROSTATIC ANALYZER USED TO OBSERVE LOW-ENERGY PARTICLE FLUXES. DATA FROM THIS WILL BE USED IN CONJUNCTION WITH MEASUREMENTS OF OTHER POLAR REGION PARAMETERS AND THEIR VARIATIONS, INCLUDING COMPOSITION, CONSTITUENT AND TOTAL DENSITY, POLAR WIND, ETC. THE OBJECT OF THE STUDY IS TO MORE ACCURATELY DEFINE PRODUCTION, LOSS, AND EQUILIBRIUM PROCESSES WHICH OCCUR WITHIN AND NEAR THE AURORAL OVAL.

----- 53-2, WILDMAN -----

EXPERIMENT NAME- RETARDING POTENTIAL ANALYZER

NSSDC ID- ST73-6A-13

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - P.J.L.WILDMANUSAF CAMBRIDGE RES LAB
BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL USE A RETARDING POTENTIAL ANALYZER TO OBSERVE ION DENSITY AND TEMPERATURE. SCREENING GRIDS WILL EXCLUDE ELECTRONS AND PROVIDE A MEANS FOR APPLYING A VARIABLE VOLTAGE TO THE IONS ENCOUNTERED. THE DATA WILL BE IN THE FORM OF GRID VOLTAGE VERSUS COLLECTOR-CURRENT CURVES. INTERPRETATION OF THESE CURVES WILL RESULT IN THE DESIRED ION TEMPERATURE AND DENSITY DATA. THESE DATA WILL BE USED WITH MEASUREMENTS OF OTHER POLAR REGION PARAMETERS AND THEIR VARIATIONS. THE OBJECT OF THE STUDY WILL BE TO MORE ACCURATELY DEFINE PRODUCTION, LOSS, AND EQUILIBRIUM PROCESSES THAT OCCUR WITHIN AND NEAR THE AURORAL OVAL.

***** SAN MARCO 4 *****

SPACECRAFT COMMON NAME- SAN MARCO 4
ALTERNATE NAMES- SAN MARCO C-2, SAN MARCO C-2
7104, SM-C2
NSSDC ID- 74-009A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 02/10/74.

LAUNCH DATE- 02/10/74 SPACECRAFT WEIGHT- KG
LAUNCH SITE- SAN MARCO PLATFORM, OFF COAST OF KENYA
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS
ITALY CRA

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 02/22/74
ORBIT PERIOD- 95.9 MIN INCLINATION- 2.92 DEG
PERIAPSIS- 231. KM ALT APOAPSIS- 910. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 08/11/74
ORBIT PERIOD- 95.370 MIN INCLINATION- 2.900 DEG
PERIAPSIS- 241.99 KM ALT APOAPSIS- 831.51 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - A.J. CAPORALENASA-GSFC
GREENBELT, MD
PS - G.P. NEWTONNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION
THE ITALIAN-BUILT SAN MARCO C-2 SPACECRAFT WAS PART OF A COOPERATIVE SPACE EFFORT BETWEEN THE ITALIAN SPACE COMMISSION (CIS) AND NASA. THE SCIENTIFIC OBJECTIVE OF SAN MARCO C-2 WAS TO PROVIDE MEASUREMENTS OF THE DIURNAL VARIATIONS OF EQUATORIAL NEUTRAL THERMOSPHERE DENSITY, COMPOSITION, AND

TEMPERATURE FOR CORRELATION WITH SIMULTANEOUS ATMOSPHERIC EXPLORER C (AE-C) DATA, TO BE USED IN STUDIES OF THE PHYSICS AND DYNAMICS OF THE LOWER THERMOSPHERE. THE SPACECRAFT CARRIED (1) A NEUTRAL ATMOSPHERE COMPOSITION EXPERIMENT (NACE) TO DETERMINE UPPER ATMOSPHERIC (160 KM AND ABOVE) CONCENTRATIONS OF ARGON, HELIUM, ATOMIC OXYGEN AND MOLECULAR OXYGEN AND NITROGEN. (2) A NEUTRAL ATMOSPHERE TEMPERATURE EXPERIMENT TO DETERMINE THE TEMPERATURE OF AMBIENT MOLECULAR NITROGEN AND (3) AN ACCELEROMETER TO MEASURE ATMOSPHERIC DENSITY NEAR SATELLITE PERIGEE.

----- SAN MARCO 4, NEWTON -----

EXPERIMENT NAME- NEUTRAL ATMOSPHERE COMPOSITION

NSSDC ID- 74-009A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 02/10/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G.P. NEWTONNASA-GSFC
GREENBELT, MD
OI - N.W. SPENCERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS FLOWN AT EQUATORIAL LATITUDES TO DETERMINE THE CONCENTRATION AND TEMPORAL (INCLUDING DIURNAL) FLUCTUATIONS OF THE FOLLOWING NEUTRAL UPPER ATMOSPHERE CONSTITUENTS -- ARGON, MOLECULAR AND ATOMIC OXYGEN, MOLECULAR NITROGEN, AND HELIUM. THE MEASUREMENTS OBTAINED WERE CORRELATED WITH APPROPRIATE ATMOSPHERIC EXPLORER C DATA. A MAGNETIC MASS SPECTROMETER WAS USED.

----- SAN MARCO 4, SPENCER -----

EXPERIMENT NAME- NEUTRAL ATMOSPHERE TEMPERATURE

NSSDC ID- 74-009A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 02/10/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - N.W. SPENCERNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WAS FLOWN TO DETERMINE BY DIRECT MEASUREMENT THE TEMPERATURE AND DENSITY OF MOLECULAR NITROGEN AT SEVERAL ALTITUDES IN THE UPPER ATMOSPHERE. THE DATA OBTAINED WERE USED TO STUDY TEMPORAL FLUCTUATIONS, AND THEY WERE ALSO CORRELATED WITH ATMOSPHERIC EXPLORER C MEASUREMENTS. THE SENSOR WAS A SMALL OMEGA-ON TUNED TO MEASURE MOLECULAR NITROGEN, AND HAD A SPECIALLY SHAPED APERTURE. TEMPERATURE WAS MEASURED DURING A SPIN-SCAN BY OBSERVING THE RESPONSE AS A FUNCTION OF ANGLE WITH THE SATELLITE VELOCITY VECTOR.

***** SARI *****

SPACECRAFT COMMON NAME- SARI
ALTERNATE NAMES-
NSSDC ID- SARI

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- 09/09/76 SPACECRAFT WEIGHT- KG
LAUNCH SITE- KOURON, FRENCH GUIANA, FRANCE
LAUNCH VEHICLE- DIAMANT

SPONSORING COUNTRY/AGENCY
FRANCE

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN INCLINATION- 90. DEG
PERIAPSIS- 300.000 KM ALT APOAPSIS- 1500.00 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION
THIS SATELLITE WILL BE PART OF FRANCE'S CONTRIBUTION TO THE INTERNATIONAL MAGNETOSPHERIC STUDY. THE SATELLITE'S OBJECTIVES WILL INCLUDE THE STUDY OF THE THERMAL PLASMA WITHIN THE MAGNETOSPHERE AND THE STUDY OF THE STRUCTURE AND ORIGINS OF NATURAL VLF NOISE. THE EXPERIMENTS WILL INCLUDE TRIAXIAL MAGNETIC AND ELECTRIC FIELD ANTENNAS (OF THE SPHERE DIPOLE TYPE) AND LOW-ENERGY ELECTRON DETECTORS IN THE ENERGY RANGE 5 TO 500 EV.

***** SAS-A *****

SPACECRAFT COMMON NAME- SAS-A
ALTERNATE NAMES- SAS 1, EXPLORER 42
UHURU 1, PL-701C
04797

NSSDC ID- 70-107A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/23/71.

LAUNCH DATE- 12/12/70 SPACECRAFT WEIGHT- 143. KG

LAUNCH SITE- SAN MARCO PLATFORM, OFF COAST OF KENYA
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 95.7 MIN
PERIAPSIS- 531.000 KM ALT

EPOCH DATE- 12/12/70
INCLINATION- 3.04 DEG
APOAPSIS- 572.000 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 95.072 MIN
PERIAPSIS- 509.96 KM ALT

EPOCH DATE- 09/06/73
INCLINATION- 3.036 DEG
APOAPSIS- 538.14 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - H.R. TOWNSENDNASA-GSFC

GREENBELT, MD

PS - C.E. FICHTELNASA-GSFC

GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

EXPLORER 42 WAS THE FIRST OF A SERIES OF SMALL SPACECRAFT WHOSE OBJECTIVES WERE TO SURVEY THE CELESTIAL SPHERE AND SEARCH FOR SOURCES RADIATING IN THE X-RAY, GAMMA-RAY, UV, AND OTHER SPECTRAL REGIONS. THE PRIMARY MISSION OF EXPLORER 42 WAS TO DEVELOP A CATALOG OF CELESTIAL X-RAY SOURCES BY SYSTEMATIC SCANNING OF THE CELESTIAL SPHERE IN THE ENERGY RANGE FROM 2 TO 20 KEV. THE SPACECRAFT WAS LAUNCHED DECEMBER 12, 1970 FROM THE SAN MARCO PLATFORM OFF THE COAST OF KENYA, AFRICA, INTO A NEAR-CIRCULAR EQUATORIAL ORBIT. THE ORBITING SPACECRAFT WAS IN THE SHAPE OF A CYLINDER APPROXIMATELY 96 CM IN DIAM AND 116 CM IN LENGTH. FOUR SOLAR PADDLES WERE USED TO RECHARGE A 6-AMP-HR EIGHT-CELL NICKEL-CADMIUM BATTERY AND TO PROVIDE POWER TO THE SPACECRAFT AND EXPERIMENT. THE SPACECRAFT WAS STABILIZED BY AN INTERNAL WHEEL, AND A MAGNETICALLY TORQUED COMMANDABLE CONTROL SYSTEM WAS USED TO POINT THE SPIN AXIS OF THE SPACECRAFT TO ANY POINT OF THE SKY. THE ASPECT SYSTEM CONSISTED OF BOTH A STAR AND SUN SENSOR THAT SHARED THE SAME PROCESSING ELECTRONICS. NORMAL OPERATION OF THE SPACECRAFT STARTED ON DECEMBER 18, 1970. DATA WERE STORED ON A ONE-ORBIT STORAGE TAPE RECORDER AND TELEMETERED DURING A 3.6-MIN PLAYBACK CYCLE. A 1000-DPS PCM/PM SYSTEM WAS USED. AFTER DECEMBER 27, 1970, THE SUN SENSOR WAS NOT EFFECTIVE BECAUSE THE SPIN AXIS OF THE SPACECRAFT WAS MAINTAINED WITHIN 30 DEG OF THE SUN DUE TO HEAT PROBLEMS. THIS RESTRICTION RESULTED IN A MODIFICATION OF THE ORIGINAL OBSERVING PROGRAM. THE TAPE RECORDER FAILED ON JANUARY 23, 1971. ONLY REAL-TIME DATA FROM DACKUP GROUND STATIONS WERE AVAILABLE AFTER JANUARY 23, 1971. THE STAR SENSOR FAILED IN NOVEMBER 1971. THE SPACECRAFT BATTERY FAILED IN EARLY APRIL 1973. SINCE THAT TIME THE SPACECRAFT HAS OPERATED ON SOLAR POWER ONLY AND HAS PRODUCED TWO TO THREE USABLE FRAMES OF DATA PER DAY.

----- SAS-A, GIACCONI -----

EXPERIMENT NAME- ALL-SKY X-RAY SURVEY

NSDDC ID- 70-107A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 04/00/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R. GIACCONIHARVARD COLLEGE OBS
CAMBRIDGE, MA
OI - E.H. KELLOGGHARVARD COLLEGE OBS
CAMBRIDGE, MA
OI - H. GURSKYHARVARD COLLEGE OBS
CAMBRIDGE, MA
OI - H. TANANBAUMHARVARD COLLEGE OBS
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE X-RAY INSTRUMENT ABOARD SAS-A (EXPLORER 42) CONSISTED OF TWO SIDES THAT WERE NEARLY IDENTICAL. BOTH PHYSICALLY AND ELECTRONICALLY. EACH SIDE CONTAINED AN X-RAY DETECTION SYSTEM COMPOSED OF A COLLIMATOR, PROPORTIONAL COUNTERS, ASSOCIATED PROCESSING ELECTRONICS, AND AN ASPECT SENSING SYSTEM. THE HIGH-RESOLUTION (SPATIAL) SIDE HAD A VIEWING ANGLE OF 0.5 DEG X 5 DEG FWHM, AND A DETECTION RANGE FROM 1 TO 20 KEV. THE OTHER SIDE HAD A HIGH-SENSITIVITY (INTENSITY) COLLIMATOR WITH A VIEWING ANGLE OF 5 DEG X 1 DEG FWHM. THIS SIDE HAD A DETECTION RANGE FROM 1 TO 10 KEV. THE CENTERS OF THE FIELDS OF VIEW OF THE TWO BANKS WERE DISPLACED FROM THE EQUATORIAL PLANE OF THE SATELLITE SUCH THAT THE FULL BANDWIDTH COVERED BY THE TWO DETECTORS DURING EACH SPIN WAS APPROXIMATELY 127 DEG. SIX PROPORTIONAL COUNTERS COMPOSED OF A BERYLLIUM SHELL WITH 2.5-MIL BERYLLIUM FOIL WINDOWS WERE BEHIND EACH COLLIMATOR. THE INTERIOR CONTAINED A 2-MIL TUNGSTEN ANODE WIRE AND A GAS COMPOSITION OF 90 PERCENT ARGON, 9.5 PERCENT CARBON DIOXIDE FOR QUENCHING, AND 0.5 PERCENT HELIUM AT A PRESSURE OF 980 MM OF MERCURY. A SET OF LOW-INTENSITY RADIOACTIVE SOURCES WERE USED FOR IN-FLIGHT CALIBRATION OF THE INSTRUMENT. THE SPIN AXIS OF THE SPACECRAFT WAS HELD FIXED IN THE SKY FOR ABOUT A DAY AT A TIME. DURING THIS PERIOD A BAND OF APPROXIMATELY 10 DEG ABOUT THE EQUATOR OF THE SPIN AXIS WAS SCANNED. THE PRIMARY DATA REDUCTION OBJECTIVE WAS TO SUPERIMPOSE THE X-RAY DATA RECORDED AS 'COUNT RATE VS TIME' TO 'COUNT RATE VS AZIMUTH' SO THAT THE SUPERIMPOSITION DATA WOULD BE EQUIVALENT TO A SINGLE SWEEP THROUGH THE OBSERVING 10-DEG BAND WITH A TOTAL OBSERVING TIME OF ONE DAY. AN ARRAY WAS CREATED OF X-RAY SUPERPOSITION

(REPRESENTING THE 360-DEG CIRCLE SCANNED) BROKEN INTO 4320 ELEMENTS OF AZIMUTH OF FIVE MINUTES EACH FOR THE 0.5-DEG DETECTOR AND 1080 ELEMENTS OF AZIMUTH OF 20 MINUTES EACH FOR THE 5-DEG DETECTOR.

***** SAS-C *****

SPACECRAFT COMMON NAME- SAS-C
ALTERNATE NAMES- PL-743D
NSDDC ID- SAS-C

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 2 QTR 75 SPACECRAFT WEIGHT- 193. KG
LAUNCH SITE- SAN MARCO PLATFORM, OFF COAST OF KENYA
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 95. MIN INCLINATION- 2.9 DEG
PERIAPSIS- 486. KM ALT APOAPSIS- 486. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - H.R. TOWNSENDNASA-GSFC

GREENBELT, MD

PS - C.E. FICHTELNASA-GSFC

GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

SAS-C WILL BE THE THIRD OF A SERIES OF SMALL SPACECRAFT WHOSE OBJECTIVES WILL BE TO SURVEY THE CELESTIAL SPHERE AND SEARCH FOR SOURCES RADIATING IN THE X-RAY, GAMMA-RAY, UV, AND OTHER SPECTRAL REGIONS. THE PRIMARY MISSIONS OF SAS-C WILL BE TO MEASURE THE X-RAY EMISSION OF DISCRETE EXTRAGALACTIC SOURCES, TO MONITOR THE INTENSITY AND SPECTRA OF GALACTIC X-RAY SOURCES FROM 0.2 TO 60 KEV, AND TO MONITOR THE X-RAY INTENSITY OF SCORPIO X-1. THE SPACECRAFT WILL BE LAUNCHED FROM THE SAN MARCO PLATFORM OFF THE COAST OF KENYA, AFRICA, INTO A NEAR CIRCULAR EQUATORIAL ORBIT. FOUR SOLAR PADDLES WILL BE USED IN CONJUNCTION WITH A 12-CELL NICKEL-CADMIUM BATTERY TO PROVIDE 65 W OF AVERAGE POWER OVER THE ENTIRE ORBIT. THE SPACECRAFT WILL BE STABILIZED ALONG THE Z AXIS AND WILL ROTATE AT ABOUT 0.1 DEG/SEC. CHANGES TO THE SPIN AXIS ORIENTATION WILL BE BY GROUND COMMAND, EITHER IN REAL TIME OR DELAYED. THE SPACECRAFT CAN BE MADE TO EITHER BACK AND FORTH PLUS OR MINUS 2.5 DEG ACROSS A SELECTED SOURCE ALONG THE X-AXIS AT 0.01 DEG/SEC. THE EXPERIMENTS CAN LOOK ALONG THE Z AXIS OF THE SPACECRAFT, PERPENDICULAR TO IT, OR AT AN ANGLE.

----- SAS-C, CLARK -----

EXPERIMENT NAME- ANALYSIS OF EXTRAGALACTIC X-RAY SOURCES

NSDDC ID- SAS-C -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.W. CLARKMASS INST OF TECH
CAMBRIDGE, MA
OI - H.V.D. BRADTMASS INST OF TECH
CAMBRIDGE, MA
OI - W.H.G. LEWINMASS INST OF TECH
CAMBRIDGE, MA
OI - H.W. SCHNOPPERSASO
CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL DETERMINE THE POSITIONS OF VERY WEAK EXTRAGALACTIC X-RAY SOURCES. THE INSTRUMENT WILL VIEW A 100-DEG-SQ REGION OF THE SKY AROUND THE DIRECTION OF THE SPIN AXIS OF THE SATELLITE. THE NOMINAL TARGETS FOR A ONE-YEAR STUDY WILL BE - (1) THE VIRGO CLUSTER OF GALAXIES FOR FOUR MONTHS, (2) THE GALACTIC EQUATOR FOR TWO MONTHS, (3) THE ANDROMEDA NEBULA FOR THREE MONTHS, AND (4) THE MAGELLANIC CLOUDS FOR THREE MONTHS. THE INSTRUMENTATION WILL CONSIST OF ONE 2.5-ARC-MIN AND ONE 4.5-ARC-MIN FWHM MODULATION COLLIMATOR, AS WELL AS PROPORTIONAL COUNTERS SENSITIVE OVER THE ENERGY RANGE FROM 1.5 TO 10 KEV. THE EFFECTIVE AREA OF EACH COLLIMATOR WILL BE ABOUT 225 CM-SQ. THE ASPECT SYSTEM WILL PROVIDE INFORMATION ON THE ORIENTATION OF THE COLLIMATORS TO AN ACCURACY OF 15 ARC-SEC.

----- SAS-C, CLARK -----

EXPERIMENT NAME- ANALYSIS OF GALACTIC X-RAY SOURCES

NSDDC ID- SAS-C -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.W. CLARKMASS INST OF TECH
CAMBRIDGE, MA
OI - H.V.D. BRADTMASS INST OF TECH
CAMBRIDGE, MA
OI - W.H.G. LEWINMASS INST OF TECH
CAMBRIDGE, MA
OI - H.W. SCHNOPPERMASS INST OF TECH
CAMBRIDGE, MA

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THIS EXPERIMENT WILL BE TO LOCATE GALACTIC X-RAY SOURCES TO 10 ARC-SEC AND TO MONITOR THESE SOURCES FOR INTENSITY VARIATIONS. THE SOURCE POSITIONS WILL BE DETERMINED WITH THE USE OF THE MODULATION COLLIMATORS OF THE EXTRAGALACTIC EXPERIMENT DURING THE NOMINAL TWO-MONTH OBSERVATION OF THE GALACTIC EQUATOR. THE MONITORING OF THE X-RAY SKY WILL BE ACCOMPLISHED BY THE USE OF THREE SLAT COLLIMATORS. ONE COLLIMATOR, 1-DY-70-DEG FWHM, WILL BE ORIENTED PERPENDICULAR TO THE EQUATORIAL PLANE OF THE SATELLITE, WHILE THE OTHER TWO EACH 0.5-DY-40-DEG FWHM, WILL BE ORIENTED 30 DEG ABOVE AND 30 DEG BELOW THE FIRST. THE DETECTOR BEHIND EACH COLLIMATOR WILL BE A PROPORTIONAL COUNTER, SENSITIVE FROM 1.0 TO 13 KEV, WITH AN EFFECTIVE AREA OF ABOUT 100 CM SQ. THE 1.0-DEG COLLIMATOR WILL HAVE AN ADDITIONAL COUNTER OF THE SAME AREA, SENSITIVE FROM 0 TO 80 KEV. THREE LINES OF POSITION WILL BE OBTAINED FOR ANY GIVEN SOURCE WHEN THE SATELLITE IS BEING SPUN AT A STEADY ROTATION OF FOUR ARC-MIN/SEC ABOUT THE Z AXIS.

----- SAS-C, CLARK -----

EXPERIMENT NAME- CONTINUOUS X-RAY FLUCTUATION MONITOR OF SCORPIO X-1

NSSDC ID- SAS-C -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - G.W. CLARKMASS INST OF TECH
 CAMBRIDGE, MA
 OI - H.V.D. DRADYMASS INST OF TECH
 CAMBRIDGE, MA
 OI - W.H.G. LEWINMASS INST OF TECH
 CAMBRIDGE, MA
 OI - H.W. SCHNOPPERSAS
 CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

A 12-DY-50-DEG FWHM SLAT COLLIMATOR WILL BE ORIENTED WITH ITS LONG AXIS PERPENDICULAR TO THE SATELLITE SPIN AXIS SUCH THAT A GIVEN POINT ON THE SKY CAN BE MONITORED FOR ABOUT 25 PERCENT OF A ROTATION. THIS COLLIMATOR WILL BE INCLINED BY 31 DEG WITH RESPECT TO THE EQUATORIAL PLANE OF THE SATELLITE. SO THAT SCORPIO X-1 WILL BE OBSERVED WHILE THE Z AXIS IS ORIENTED TO THE VIRGO CLUSTER OF GALAXIES. THE DETECTORS USED IN THIS EXPERIMENT WILL BE PROPORTIONAL COUNTERS WITH A 1-MIL BE WINDOW. THE ENERGY RANGE WILL BE FROM 1.0 TO 60 KEV, AND THE TOTAL EFFECTIVE AREA WILL BE ABOUT 40 CM SQ.

----- SAS-C, CLARK -----

EXPERIMENT NAME- X-RAY ABSORPTION CONTOURS OF THE GALAXY

NSSDC ID- SAS-C -04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - G.W. CLARKMASS INST OF TECH
 CAMBRIDGE, MA
 OI - H.V.D. DRADYMASS INST OF TECH
 CAMBRIDGE, MA
 OI - W.H.G. LEWINMASS INST OF TECH
 CAMBRIDGE, MA
 OI - H.W. SCHNOPPERMASS INST OF TECH
 CAMBRIDGE, MA

EXPERIMENT BRIEF DESCRIPTION

THE DENSITY AND DISTRIBUTION OF THE INTERSTELLAR MATTER WILL BE DETERMINED BY MEASURING THE VARIATION IN THE INTENSITY OF THE LOW ENERGY DIFFUSE X-RAY BACKGROUND AS A FUNCTION OF GALACTIC LATITUDE. A ONE-MICRON POLYPROPYLENE WINDOW PROPORTIONAL COUNTER WILL BE USED FOR THE 0.1- TO 0.25-KEV AND 0.5- TO 1.0-KEV ENERGY RANGES, WHILE A TWO-MICRON TITANIUM WINDOW COUNTER WILL COVER THE ENERGY RANGE FROM 0.3 TO 0.5 KEV. IN ADDITION, TWO 1-MIL BE WINDOW COUNTERS WILL BE USED FOR THE 1.0- TO 10-KEV ENERGY RANGE. THE COLLIMATORS IN THIS EXPERIMENT WILL HAVE FIELDS OF VIEW OF 3 DEG FOR THE ONE-MICRON COUNTER, 2 DEG FOR THE TWO-MICRON COUNTER, AND 2 DEG FOR THE ONE-MIL COUNTERS.

***** SEASAT-A *****

SPACECRAFT COMMON NAME- SEASAT-A
 ALTERNATE NAMES- OCEAN DYNAMICS SAT.
 NSSDC ID- SEASAT-A

LAST REPORTED STATE- A PROPOSED MISSION

LAUNCH DATE- 1978 SPACECRAFT WEIGHT- KG
 LAUNCH SITE-
 LAUNCH VEHICLE-

SPONSORING COUNTRY/AGENCY
 UNITED STATES NASA-0A

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
 ORBIT PERIOD- 99. MIN
 PERIAPSIS- 800. KM ALT INCLINATION- 100. DEG
 APOAPSIS- 800. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PM - UNKNOWNNASA-WFO
 WOLLOPS ISLAND, VA

SPACECRAFT BRIEF DESCRIPTION

THE OCEAN DYNAMICS SATELLITE (SEASAT-A) IS BEING DESIGNED TO PROVIDE MEASUREMENTS OF WAVE HEIGHT AND DIRECTION SPECTRUM, SURFACE WIND SPEED AND DIRECTION, SEA SURFACE TOPOGRAPHY, AND HIGH RESOLUTION RADAR AND INFRARED IMAGERY OF SELECTED AREAS OF THE OCEAN. THE INSTRUMENT PAYLOAD BEING CONSIDERED CONSISTS OF X-BAND COMPRESSED PULSE RADAR ALTIMETER, COHERENT SYNTHETIC APERTURE IMAGING RADAR, MICROWAVE WIND SCATTEROMETER, SCANNING MULTIFREQUENCY MICROWAVE RADIOMETER, AND INFRARED RADIOMETER. SOME OF THE ACCURACIES EXPECTED ARE DISTANCE BETWEEN SPACECRAFT AND OCEAN SURFACE TO 10 CM, WIND SPEEDS TO 6.6 FPS, AND SURFACE TEMPERATURES TO 1 DEG C.

***** SEASP 73-5 *****

SPACECRAFT COMMON NAME- SEASP 73-5
 ALTERNATE NAMES- SEASP 873-5
 NSSDC ID- ST73-5A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 10/29/74 SPACECRAFT WEIGHT- KG
 LAUNCH SITE- VANDENBERG AFB, UNITED STATES
 LAUNCH VEHICLE-

SPONSORING COUNTRY/AGENCY
 UNITED STATES DOD

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
 ORBIT PERIOD- 144 MIN INCLINATION- 90. DEG
 PERIAPSIS- 144 KM ALT APOAPSIS- 4500. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 SPACECRAFT BRIEF DESCRIPTION

THIS SATELLITE WILL CARRY EIGHT COMPLEMENTARY TYPES OF EXPERIMENTS, DESIGNED TO STUDY ATMOSPHERIC DENSITY AND ITS CHANGES AT LOW ALTITUDES. THE SATELLITE WILL BE SPIN STABILIZED, WITH THE SPIN AXIS PERPENDICULAR TO ITS POLAR ORBIT. ORBIT PRECESSION, WHEN THE ORBIT IS INCLINED MORE THAN 70 DEG, WILL BE LIMITED TO LESS THAN 0.5 DEG PER DAY. THIS WILL LIMIT OBSERVATIONS FOR SAMPLING TO LESS THAN ONE-FOURTH OF THE POSSIBLE 24 HRS OF LOCAL SOLAR TIME OVER THE EXPECTED 6-MONTH SATELLITE LIFETIME.

----- SEASP 73-5, MARCOS -----

EXPERIMENT NAME- ACCELEROMETER DENSITY OBSERVATIONS

NSSDC ID- ST73-5A-01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - F.A. MARCOSUSAF CAMBRIDGE RES LAB
 BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL STUDY NEUTRAL DENSITY AND ITS VARIATIONS BETWEEN 135 AND 485 KM. THE EQUIPMENT WILL CONSIST OF TWO DIFFERENT ACCELEROMETERS. DENSITY PROFILES NEAR PERIGEE WILL BE COMPUTED FROM SPACECRAFT ACCELERATION DATA AND KNOWLEDGE OF THE SPACECRAFT SHAPE, MASS, AND ALTITUDE. WITH DATA LIMITED TO THE PERIGEE REGION OF THE ORBIT, THE EXPECTED 6-MONTH EXPERIMENT LIFETIME SHOULD PROVIDE DATA COVERAGE OVER AN APPRECIABLE SPAN OF SOLAR TIME (DUE TO THE ORBIT PRECESSION) AND OVER ALL LATITUDES (DUE TO PERIGEE MOTION).

----- SEASP 73-5, MARCOS -----

EXPERIMENT NAME- ION DENSITY GAUGES

NSSDC ID- ST73-5A-02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - F.A. MARCOSUSAF CAMBRIDGE RES LAB
 BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

TWO IONIZATION DENSITY SENSORS AND A COLD CATHODE ION GAUGE WILL BE USED TO OBSERVE ATMOSPHERIC NEUTRAL DENSITIES. THE NEUTRAL PARTICLES WILL BE IONIZED BY THE DETECTOR, AND THE ION CURRENT TO A CHARGED COLLECTOR WILL PROVIDE THE DATA FROM WHICH THE NEUTRAL DENSITY PROFILES WILL BE DETERMINED. IT IS INTENDED TO OBTAIN NEUTRAL DENSITIES BETWEEN 175 AND 485 KM. WITH DATA LIMITED TO THE PERIGEE REGION OF THE ORBIT, THE EXPECTED 6-MONTH EXPERIMENT LIFETIME SHOULD PROVIDE DATA COVERAGE OVER AN APPRECIABLE SPAN OF SOLAR TIME (DUE TO THE ORBIT PRECESSION) AND OVER ALL LATITUDES (DUE TO PERIGEE MOTION).

----- SESP 73-5, PHILBRICK -----
 EXPERIMENT NAME- MASS SPECTROMETER
 NSSDC ID- ST73-SA-03
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - C.R. PHILBRICKUSAF CAMBRIDGE RES LAB
 BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT IS DESIGNED TO MEASURE THE COMPOSITION
 AND CONSTITUENT DENSITIES OF THE ATMOSPHERE BETWEEN 140 AND
 500 KM. OF PARTICULAR INTEREST ARE CONSTITUENT AND
 CONSTITUENT-DENSITY CHANGES CAUSED BY SOLAR AND GEOMAGNETIC
 VARIATIONS. OVER THE 6-MONTH PLANNED EXPERIMENT LIFETIME,
 PERIGEE NOTATION IS EXPECTED TO ALLOW SAMPLING OVER A
 CONSIDERABLE LATITUDE, BUT LOCAL TIME WILL VARY OVER A RANGE
 OF ONLY ABOUT 6 HOURS.

----- SESP 73-5, PRAG -----
 EXPERIMENT NAME- SOLAR UV EXPERIMENT
 NSSDC ID- ST73-SA-04
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - A.B. PRAGAEROSPACE CORP
 LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT WILL MEASURE THE ABSOLUTE INTENSITY OF
 THE SOLAR UV FLUX (BETWEEN 300 AND 1800 Å) INCIDENT ON THE
 EARTH'S ATMOSPHERE. THE WAVELENGTH BANDS OF PARTICULAR
 INTEREST (300 TO 1000 Å AND 1400 TO 1800 Å) ARE THOSE RELATED
 MOST CLOSELY TO NEUTRAL DENSITY VARIATIONS AND VARIATION IN
 COMPOSITION ABOVE 120 KM.

----- SESP 73-5, PRAG -----
 EXPERIMENT NAME- ELECTROSTATIC ANALYZER
 NSSDC ID- ST73-SA-05
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - A.B. PRAGAEROSPACE CORP
 LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
 THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBSERVE THE
 ELECTRON AND ION FLUXES IN THE 120- TO 500-KM REGION OF THE
 ATMOSPHERE. CORRELATIVE STUDIES OF THESE OBSERVATIONS WITH
 DENSITY (OR OTHER DENSITY-RELATED PHENOMENA) WILL HELP
 DETERMINE CAUSES FOR DENSITY VARIATIONS IN THIS REGION.

----- SESP 73-5, PRAG -----
 EXPERIMENT NAME- RETARDING POTENTIAL ANALYZER
 NSSDC ID- ST73-SA-06
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - A.B. PRAGAEROSPACE CORP
 LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
 THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBSERVE THE
 PLASMA TEMPERATURES IN THE 120- TO 500-KM REGION OF THE
 ATMOSPHERE. CORRELATIVE STUDIES OF THESE OBSERVATIONS WITH
 DENSITY (OR OTHER DENSITY-RELATED PHENOMENA) WILL HELP TO
 DETERMINE CAUSES FOR DENSITY VARIATIONS IN THIS REGION.

----- SESP 73-5, PRAG -----
 EXPERIMENT NAME- ELF-VLF RECEIVER
 NSSDC ID- ST73-SA-07
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - A.B. PRAGAEROSPACE CORP
 LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
 THE PURPOSE OF THIS EXPERIMENT WILL BE TO OBSERVE THE AC
 ELECTRIC AND MAGNETIC FIELDS IN THE ATMOSPHERE ABOVE 120 KM.
 CORRELATIVE STUDIES OF THESE OBSERVATIONS WITH DENSITY (AND
 OTHER DENSITY-RELATED PHENOMENA) WILL HELP DETERMINE CAUSES
 FOR DENSITY VARIATIONS IN THE UPPER ATMOSPHERE.

***** SESP 74-2 *****
 SPACECRAFT COMMON NAME- SESP 74-2
 ALTERNATE NAMES- 53-3
 NSSDC ID- ST74-2A
 LA REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 1 OCT 76 SPACECRAFT WEIGHT- KG
 LAUNCH SITE- VANDENBERG AFB, UNITED STATES
 LAUNCH VEHICLE-

SPONSORING COUNTRY/AGENCY
 UNITED STATES DOD-USAF

PLANNED ORBIT PARAMETERS
 ORBIT TYPE- GEOCENTRIC
 ORBIT PERIOD- MIN INCLINATION- DEG
 PERIAPSIS- 200. KM ALT APOAPSIS- 8000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PM - UNKNOWNUNKNOWN
 PS - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION
 THIS SPACECRAFT WILL BE A SMALL OBSERVATORY IN A NEAR
 POLAR ORBIT WITH EIGHT DIFFERENT SENSORS ON BOARD, DESIGNED TO
 OBSERVE VARIOUS MAGNETOSPHERIC PARAMETERS AND THEIR
 INTERRELATIONSHIPS. SENSORS OBSERVING ENERGETIC PROTONS AND
 ALPHA PARTICLES WILL ALSO PROVIDE REAL-TIME OBSERVATIONS FOR
 USE BY THE SPACE FORECAST FACILITY (USAF-AWS). INFORMATION OF
 THE SPACECRAFT SIZE, SHAPE, POWER SYSTEM, ATTITUDE SYSTEM,
 ETC. ARE NOT YET AVAILABLE. THIS IS THE THIRD SPACECRAFT OF A
 NEW DESIGN WHICH HAS BEEN DEVELOPED FOR DOD USE.

----- SESP 74-2, FENNEL -----
 EXPERIMENT NAME- HYDROGEN-HELIUM MASS SPECTROMETER (HE+
 AND H+ 10-80 KEV, PROTONS 0.2-100 KEV)
 NSSDC ID- ST74-2A-08
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - J.F. FENNELAEROSPACE CORP
 LOS ANGELES, CA

EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT WILL MEASURE THE H-HE PARTICLE
 DISTRIBUTION AT INJECTION INTO RADIATION BELTS AND THROUGHOUT
 THE OUTER REGIONS OF THE MAGNETOSPHERE. THIS INSTRUMENT WILL
 MEASURE PROTON FLUX FROM 0.2 TO 100 KEV, AND FLUX OF H+,
 HE+, AND HE++ IN THE ENERGY RANGE FROM 10 TO 80 KEV.

----- SESP 74-2, JOHNSON -----
 EXPERIMENT NAME- LOW-ENERGY PARTICLE SPECTROMETER
 NSSDC ID- ST74-2A-02
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - R.G. JOHNSONLOCKHEED PALO ALTO
 PALO ALTO, CA

EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT WILL CONSIST OF AN 11-CHANNEL PROTON AND
 ELECTRON SPECTROMETER TO OBSERVE THE SATELLITE SPIN AXIS
 PERPENDICULAR TO THE ORBIT PLANE. IT WILL OBSERVE PARTICLES
 IN THE 0.5- TO 50-KEV REGION.

----- SESP 74-2, KELLY -----
 EXPERIMENT NAME- LOW-ENERGY PARTICLE SENSORS (0.1-100KEV)
 NSSDC ID- ST74-2A-03
 LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
 PI - J. KELLYUSAF CAMBRIDGE RES LAB
 BEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION
 THIS EXPERIMENT WILL OBSERVE PROTONS (0.1 TO 100 MEV)
 TRAPPED WITHIN THE GEOMAGNETIC CAVITY. DATA WILL BE MADE
 AVAILABLE FOR REAL-TIME USE AND RECORDED FOR LONG-TERM STUDY.
 THE PRIMARY OBJECTIVES WILL BE TO AID THE USAF AIR WEATHER
 SERVICE IN PROVIDING SPACE ENVIRONMENT FORECASTS AND TO
 DEVELOP IMPROVED TECHNIQUES FOR PERFORMING THESE FORECASTS.

----- SESP 74-2, KELLY -----
 EXPERIMENT NAME- PROTON-ALPHA DETECTOR (20-100 MEV)
 NSSDC ID- ST74-2A-04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J. KELLYUSAF CAMBRIDGE RES LAB
OEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL OBSERVE ALPHA-PARTICLE POPULATION (20-100 MEV) WITHIN THE GEOMAGNETIC CAVITY. DATA WILL BE MADE AVAILABLE FOR REAL-TIME USE, AND ALSO RECORDED FOR LONG-TERM STUDY. THE PRIMARY USE WILL BE BY USAF AIR WEATHER SERVICE IN PROVIDING SPACE ENVIRONMENT FORECASTS AND IN DEVELOPING IMPROVED TECHNIQUES FOR THESE FORECASTS.

----- SESP 74-2, MOZER -----

EXPERIMENT NAME- DC ELECTRIC FIELDS

NSSDC ID- ST74-2A-01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - F.S. MOZERU OF CALIF, BERKELEY
BERKELEY, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MAKE VECTOR ELECTRIC FIELD MEASUREMENTS, UNDER VARIOUS CONDITIONS, AT A VARIETY OF MAGNETOSPHERIC LOCATIONS. THE MEASUREMENTS WILL BE USED IN STUDYING VARIATIONS IN RADIO FREQUENCY, WAVE PROPAGATION, OPTICAL EMISSIONS, ETC., OBSERVED WITH OTHER EXPERIMENTAL EQUIPMENT.

----- SESP 74-2, SAGALYN -----

EXPERIMENT NAME- ELECTRIC FIELDS-ION DRIFT

NSSDC ID- ST74-2A-05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.C. SAGALYNUSAF CAMBRIDGE RES LAB
OEDFORD, MA

OI - M. SHIDYUSAF CAMBRIDGE RES LAB
OEDFORD, MA

OI - P.J.L. WILDMANUSAF CAMBRIDGE RES LAB
OEDFORD, MA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS TO MAKE WORLDWIDE OBSERVATIONS OF THE DIRECTION AND MAGNITUDE OF ELECTRIC FIELDS IN THE MAGNETOSPHERE AND OUTER IONOSPHERE FOR FREQUENCIES UP TO 200 KHZ. THE INFLUENCE OF THESE ELECTRIC FIELDS ON PLASMA MOTIONS AND CURRENT SYSTEMS WILL BE STUDIED. THESE OBSERVATIONS WILL ALSO CONTRIBUTE TO IMPROVED MODELS OF IONOSPHERIC AND MAGNETOSPHERIC CURRENT SYSTEMS.

----- SESP 74-2, VAMPOLA -----

EXPERIMENT NAME- ENERGETIC ELECTRON (0.02-2 MEV)
MAGNETIC SPECTROMETER

NSSDC ID- ST74-2A-07

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - A.L. VAMPOLAAEROSPACE CORP
EL SEGUNDO, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF A 12-CHANNEL MAGNETIC SPECTROMETER USED TO OBTAIN VALUES AND MONITOR CHANGES IN THE EQUATORIAL PITCH-ANGLE AND ENERGY DISTRIBUTION OF 0.02- TO 2-MEV ELECTRONS AS A FUNCTION OF MAGNETIC ACTIVITY.

***** SHINSEI *****

SPACECRAFT COMMON NAME- SHINSEI
ALTERNATE NAMES- MS F-2, 05405
NSSDC ID- 71-080A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 09/28/71.

LAUNCH DATE- 09/28/71 SPACECRAFT WEIGHT- 138. KG
LAUNCH SITE- KAGOSHIMA, JAPAN
LAUNCH VEHICLE- M-45-J

SPONSORING COUNTRY/AGENCY
JAPAN TOKYO U

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 09/29/71
ORBIT PERIOD- 113. MIN INCLINATION- 32. DEG
PERIAPSIS- 872.000 KM ALT APOAPSIS- 1071.00 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 113. MIN
PERIAPSIS- 870.000 KM ALT

EPOCH DATE- 12/27/73
INCLINATION- 32. DEG
APOAPSIS- 1071.00 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - K. HIRAOU OF TOKYO
TOKYO, JAPAN
PS - N. FUGONORADIO RESEARCH LAB
TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION

SHINSEI WAS THE FIRST JAPANESE SCIENTIFIC SATELLITE LAUNCHED. SCIENTIFIC PAYLOAD INCLUDED SOLAR RADIO RECEIVERS, COSMIC-RAY DETECTORS, AND IONOSPHERIC PROBES. POWER-SUPPLYING SYSTEM CONSISTS OF SOLAR CELLS AND NICKEL CADMIUM BATTERIES. THE SATELLITE WAS A 26-SIDED BODY MEASURING 71.2 CM IN DIAMETER ACROSS THE FLAT SIDES.

***** SIRIO-A *****

SPACECRAFT COMMON NAME- SIRIO-A
ALTERNATE NAMES-
NSSDC ID- SIRIO-A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- SEPT 76 SPACECRAFT WEIGHT- KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
ITALY

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 1440. MIN
PERIAPSIS- 35700. KM ALT

INCLINATION- 0. DEG
APOAPSIS- 35700. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUNKNOWN

PS - UNKNOWNUNKNOWN

SPACECRAFT BRIEF DESCRIPTION

THIS SATELLITE WILL BE PRIMARILY A GEOSTATIONARY COMMUNICATIONS SATELLITE. IT WILL INCLUDE EXPERIMENTS MEASURING THE LOCAL PLASMA AND FIELD ENVIRONMENT AND THE FLUX OF LOW-ENERGY COSMIC RAYS. THE SATELLITE POINT WILL BE LOCATED AT 15 DEG W LONGITUDE.

***** SMS-A *****

SPACECRAFT COMMON NAME- SMS-A
ALTERNATE NAMES- SMS 1, SYNCH METEOROL SATELL A
NSSDC ID- 74-033A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 06/27/74.

LAUNCH DATE- 05/17/74 SPACECRAFT WEIGHT- 627. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NOAA-NESF
UNITED STATES NASA-DA

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 1278.4 MIN
PERIAPSIS- 31112.0 KM ALT

EPOCH DATE- 05/21/74
INCLINATION- 1.006 DEG
APOAPSIS- 34169.3 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.V. FORDYCENASA-GSFC
GREENBELT, MD

PS - W.E. SHENKNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE SMS-A WAS A NASA-DEVELOPED, NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT CARRIED (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO PROVIDE HIGH QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM, (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LOCATED EARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENTAL MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SOLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT MEASURED 100.5 CM IN DIAMETER AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT EXTENDED AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WERE A HONEYCOMBED EQUIPMENT SHELF AND A THRUST TUBE. THE VISSR TELESCOPE WAS MOUNTED ON THE EQUIPMENT SHELF AND VIEWED THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE EXTENDED RADIALLY OUT FROM THE THRUST TUBE AND WAS AFFIXED TO THE SOLAR PANELS, WHICH FORMED THE OUTER WALLS OF THE SPACECRAFT AND PROVIDED THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WERE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WERE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS

MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT USED BOTH UHF- AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER VHF TRANSPONDER PROVIDED TELEMETRY AND COMMAND DURING LAUNCH AND THEN SERVED AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAD ATTAINED SYNCHRONOUS ORBIT.

----- SMS-A, NESS STAFF -----

EXPERIMENT NAME- VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)

NSSDC ID- 74-033A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 06/27/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - NESS STAFFNOAA-NESS SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) FLOWN ON SMS-A WAS CAPABLE OF PROVIDING DAY/NIGHT OBSERVATIONS OF CLOUD COVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS, SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WAS ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRON) USED A COMMON OPTICS SYSTEM. INCOMING RADIATION WAS RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHIEY-CRÉTIEEN OPTICAL SYSTEM. THE SCAN MIRROR WAS SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS, WHICH WAS ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) PROVIDED A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WAS ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE TOOK 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NAIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR SENSED THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 0 KM AT ZERO NAIR ANGLE. THE INFRARED PORTION OF THE DETECTOR MEASURED RADIANCE TEMPERATURES BETWEEN 100 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WAS DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, Wallops Island, VA. THERE THE SIGNAL WAS FEED INTO A 'LINE STRETCHER,' WHERE IT WAS STORED AND THEN STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REBROADCAST AT APT USER STATIONS. AS WITH ALL OPERATIONAL-TYPE DATA, THE VISSR DATA WERE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

----- SMS-A, UNKNOWN -----

EXPERIMENT NAME- METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM

NSSDC ID- 74-033A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 06/27/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - UNKNOWNUNKNOWN

EXPERIMENT BRIEF DESCRIPTION

THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WAS AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO PERCEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA WERE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS COULD BE HANDLED BY THE SYSTEM. THE SYSTEM ALSO ALLOWED FOR THE RETRANSMISSION OF NARROW-BAND (WEFAX TYPE) DATA TO EXISTING SMALL GROUND-BASED APT RECEIVING STATIONS FROM A LARGER WEATHER CENTRAL FACILITY. THIS COMMUNICATIONS SYSTEM OPERATED ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMS CONSISTED OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WAS BETWEEN 350K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS VARIED FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCP STATION.

----- SMS-A, WILLIAMS -----

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR

NSSDC ID- 74-033A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 06/27/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.J. WILLIAMSNOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE HEIGHT DISCRIMINATION, WERE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE/ENERGY MEASUREMENTS -- SEVEN CHANNELS MEASURED PROTONS IN THE RANGE 1 TO 500 MEV, SIX CHANNELS MEASURED ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV, AND ONE CHANNEL MEASURED ELECTRONS GREATER THAN 0.5 MEV.

----- SMS-A, WILLIAMS -----

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NSSDC ID- 74-033A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 06/27/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.J. WILLIAMSNOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE PROPOSED X-RAY COUNTER WAS COMPOSED OF A COLLIMATOR, TWO IONIZATION CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAD BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WAS MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WAS FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 0-A X RAYS, AND HAD A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WAS FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES AND HAD A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.6- TO 3-A.

----- SMS-A, WILLIAMS -----

EXPERIMENT NAME- MAGNETIC FIELD MONITOR

NSSDC ID- 74-033A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 06/27/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.J. WILLIAMSNOAA-ERL BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS ARE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (APPROXIMATELY 2 FT), ONE SENSOR WAS ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR HAD A SELECTABLE RANGE (150, 100, 200, OR 400 GAUSS), AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAUSS IN 40-GAUSS STEPS), AND AN INFLIGHT CALIBRATION CAPABILITY.

***** SMS-B *****

SPACECRAFT COMMON NAME- SMS-B

ALTERNATE NAMES- PL-731E, SYNCH METEOROL SATELL B

NSSDC ID- SMS-B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 01/00/75 SPACECRAFT WEIGHT- 243. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY

UNITED STATES NOAA-NESS
UNITED STATES NASA-DA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC INCLINATION- 0.0 DEG
ORBIT PERIOD- 1400. MIN APDAPSIS- 35700. KM ALT
PERIAPSIS- 35700. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)

PM - D.V. FORDYCENASA-GSPC

PS - W.E. SHENKNASA-GSPC

GREENBELT, MD GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE SMS-B WILL BE A NASA-DEVELOPED, NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO PROVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM, (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL ART-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTE EARTH-BASED PLATFORMS, AND (3) A SPACE ENVIRONMENT MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SOLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAMETER AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A HONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE

MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SOLAR PANELS, WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SENS EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF- BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEMS. A LOW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

----- SMS-B, NESS STAFF -----

EXPERIMENT NAME- VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)

NSSDC ID- SMS-B -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFF *****NOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON SMS-B WILL BE CAPABLE OF PROVIDING DAY/NIGHT OBSERVATIONS OF CLOUDCOVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS, SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.65 TO 0.75 MICRON) WILL USE A COMMON OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHIEY-CRETIEN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS, WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 10.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NAIR ANGLE. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO NAIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES BETWEEN 100 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, WOLLOPS ISLAND, VA. THERE THE SIGNAL WILL BE FED INTO A "LINE STRETCHER," WHERE IT WILL BE STORED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REBROADCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL-TYPE DATA, THE VISSR DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

----- SMS-D, UNKNOWN -----

EXPERIMENT NAME- METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM

NSSDC ID- SMS-D -05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN*****

EXPERIMENT BRIEF DESCRIPTION

THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WEXAF TYPE) DATA TO EXISTING SMALL GROUND-BASED APT RECEIVING STATIONS FROM A LARGER WEATHER CENTRAL FACILITY. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION FOR ONE SMS WILL CONSIST OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCP STATION.

----- SMS-R, WILLIAMS -----

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR

NSSDC ID- SMS-R -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE HEIGHT DISCRIMINATION, WILL BE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE/ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 300 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

----- SMS-D, WILLIAMS -----

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NSSDC ID- SMS-D -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IONIZATION CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS, AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.5- TO 3-A.

----- SMS-R, WILLIAMS -----

EXPERIMENT NAME- MAGNETIC FIELD MONITOR

NSSDC ID- SMS-R -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BOOM (APPROXIMATELY 2 FT), ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE RANGE (+50, 100, 200, OR 400 GAUSS). AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAUSS IN 40-GAUSS STEPS), AND AN INFLIGHT CALIBRATION CAPABILITY.

***** SMS-C *****

SPACECRAFT COMMON NAME- SMS-C

ALTERNATE NAMES- GOS-A

NSSDC ID- SMS-C

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 00/00/75 SPACECRAFT WEIGHT- 243. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY
UNITED STATES NOAA-NESS
UNITED STATES NASA-GA

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC INCLINATION- 0.0 DEG
ORBIT PERIOD- 1430 MIN
PERIAPSIS- 35700 KM ALT APOAPSIS- 35700 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - D.V. FORDYCE *****NASA-GSFC
GREENBELT, MD
PS - W.E. SHENK *****NASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE SMS-C/GOS-A WILL BE A NASA-DEVELOPED, NOAA-OPERATED SPACECRAFT. THE SPIN-STABILIZED, EARTH-SYNCHRONOUS SPACECRAFT

WILL CARRY (1) A VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO PROVIDE HIGH-QUALITY DAY/NIGHT CLOUDCOVER DATA AND TO TAKE RADIANCE TEMPERATURES OF THE EARTH/ATMOSPHERE SYSTEM. (2) A METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM TO RELAY PROCESSED DATA FROM CENTRAL WEATHER FACILITIES TO SMALL, APT-EQUIPPED REGIONAL STATIONS AND TO COLLECT AND RETRANSMIT DATA FROM REMOTELY LOCATED EARTH-BASED PLATFORMS. AND (3) A SPACE ENVIRONMENT MONITOR (SEM) SYSTEM TO MEASURE PROTON, ELECTRON, AND SOLAR X-RAY FLUXES AND MAGNETIC FIELDS. THE CYLINDRICALLY-SHAPED SPACECRAFT WILL MEASURE 190.5 CM IN DIAMETER AND 230 CM IN LENGTH, EXCLUSIVE OF A MAGNETOMETER THAT WILL EXTEND AN ADDITIONAL 83 CM BEYOND THE CYLINDER SHELL. THE PRIMARY STRUCTURAL MEMBERS WILL BE A HONEYCOMBED EQUIPMENT SHELF AND THRUST TUBE. THE VISSR TELESCOPE WILL BE MOUNTED ON THE EQUIPMENT SHELF AND WILL VIEW THE EARTH THROUGH A SPECIAL APERTURE IN THE SPACECRAFT'S SIDE. A SUPPORT STRUCTURE WILL EXTEND RADIALLY OUT FROM THE THRUST TUBE AND WILL BE AFFIXED TO THE SOLAR PANELS, WHICH WILL FORM THE OUTER WALLS OF THE SPACECRAFT AND PROVIDE THE PRIMARY SOURCE OF ELECTRICAL POWER. LOCATED IN THE ANNULUS-SHAPED SPACE BETWEEN THE THRUST TUBE AND THE SOLAR PANELS WILL BE STATIONKEEPING AND DYNAMICS CONTROL EQUIPMENT, BATTERIES, AND MOST OF THE SEM EQUIPMENT. PROPER SPACECRAFT ATTITUDE AND SPIN RATE (APPROXIMATELY 100 RPM) WILL BE MAINTAINED BY TWO SEPARATE SETS OF JET THRUSTERS MOUNTED AROUND THE SPACECRAFT'S EQUATOR AND ACTIVATED BY GROUND COMMAND. THE SPACECRAFT WILL USE BOTH UHF-BAND AND S-BAND FREQUENCIES IN ITS TELEMETRY AND COMMAND SUBSYSTEM. A LOW-POWER VHF TRANSPONDER WILL PROVIDE TELEMETRY AND COMMAND DURING LAUNCH AND THEN WILL SERVE AS A BACKUP FOR THE PRIMARY SUBSYSTEM ONCE THE SPACECRAFT HAS ATTAINED SYNCHRONOUS ORBIT.

----- SMS-C, NESS STAFF -----

EXPERIMENT NAME- VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR)

NSSDC ID- SMS-C -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFF *****NOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION
THE VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR) TO BE FLOWN ON SMS-C WILL BE CAPABLE OF PROVIDING DAY/NIGHT OBSERVATIONS OF CLOUDCOVER AND EARTH/CLOUD RADIANCE TEMPERATURE MEASUREMENTS FROM A SYNCHRONOUS, SPIN-STABILIZED, GEOSTATIONARY SATELLITE FOR USE IN OPERATIONAL WEATHER ANALYSIS AND FORECASTING. THE TWO-CHANNEL INSTRUMENT WILL BE ABLE TO TAKE BOTH FULL AND PARTIAL PICTURES OF THE EARTH'S DISC. THE INFRARED CHANNEL (10.5 TO 12.5 MICRONS) AND THE VISIBLE CHANNEL (0.55 TO 0.75 MICRON) WILL USE A COMMON OPTICS SYSTEM. INCOMING RADIATION WILL BE RECEIVED BY AN ELLIPTICALLY-SHAPED SCAN MIRROR AND COLLECTED BY A RITCHIEY-CRUIKEN SHOTGUN OPTICAL SYSTEM. THE SCAN MIRROR WILL BE SET AT A NOMINAL ANGLE OF 45 DEG TO THE VISSR OPTICAL AXIS, WHICH WILL BE ALIGNED PARALLEL TO THE SPIN AXIS OF THE SPACECRAFT. THE SPINNING MOTION OF THE SPACECRAFT (APPROXIMATELY 100 RPM) WILL PROVIDE A WEST-TO-EAST SCAN MOTION WHEN THE SPIN AXIS OF THE SPACECRAFT IS ORIENTED PARALLEL WITH THE EARTH'S AXIS. THE LATITUDINAL SCAN WILL BE ACCOMPLISHED BY SEQUENTIALLY TILTING THE SCANNING MIRROR NORTH TO SOUTH AT THE COMPLETION OF EACH SPIN. A FULL PICTURE WILL TAKE 18.2 MIN TO COMPLETE AND ABOUT 2 MIN TO RETRACE. DURING EACH SCAN, EIGHT VISIBLE-SPECTRUM DETECTORS WILL SWEEP THE EARTH, WITH A GROUND RESOLUTION OF 0.9 KM AT ZERO NAIR ANGLES. A MERCURY-CADMIUM TELLURIDE DETECTOR WILL SENSE THE INFRARED PORTION OF THE SPECTRUM WITH A HORIZONTAL RESOLUTION OF APPROXIMATELY 9 KM AT ZERO NAIR ANGLE. THE INFRARED PORTION OF THE DETECTOR WILL MEASURE RADIANCE TEMPERATURES BETWEEN 180 AND 315 DEG K WITH A PROPOSED SENSITIVITY BETWEEN 0.4 AND 1.4 DEG K. THE VISSR OUTPUT WILL BE DIGITIZED AND TRANSMITTED TO THE NOAA COMMAND DATA ACQUISITION STATION, WALLPUS ISLAND, VA. THERE THE SIGNAL WILL BE FED INTO A LINE STRETCHER, WHERE IT WILL BE STORED AND TIME-STRETCHED FOR TRANSMISSION BACK TO THE SATELLITE AT REDUCED BANDWIDTH FOR REBROADCAST TO APT USER STATIONS. AS WITH ALL OPERATIONAL-TYPE DATA, THE VISSR DATA WILL BE HANDLED BY NOAA AND EVENTUALLY SENT TO THE NATIONAL CLIMATIC CENTER AT ASHEVILLE, NORTH CAROLINA, FOR ARCHIVING.

----- SMS-C, UNKNOWN -----

EXPERIMENT NAME- METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM

NSSDC ID- SMS-C -05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN *****UNKNOWN*****

EXPERIMENT BRIEF DESCRIPTION
THE METEOROLOGICAL DATA COLLECTION AND TRANSMISSION SYSTEM WILL BE AN EXPERIMENTAL COMMUNICATIONS AND DATA HANDLING SYSTEM DESIGNED TO RECEIVE AND PROCESS METEOROLOGICAL DATA COLLECTED FROM REMOTELY LOCATED EARTH-BASED DATA COLLECTION (OBSERVATION) PLATFORMS (DCP). THE COLLECTED DATA

WILL BE RETRANSMITTED FROM THE SATELLITE TO SMALL, GROUND-BASED, REGIONAL DATA UTILIZATION CENTERS. DATA FROM UP TO 10,000 DCP STATIONS CAN BE HANDLED BY THE SYSTEM. THE SYSTEM WILL ALSO ALLOW FOR THE RETRANSMISSION OF NARROW-BAND (WIFAX TYPE) DATA FROM CENTRALIZED WEATHER FACILITIES TO EXISTING SMALL, GROUND-BASED APT RECEIVING STATIONS. THIS COMMUNICATIONS SYSTEM WILL OPERATE ON S-BAND FREQUENCIES. THE MINIMUM DATA COLLECTION SYSTEM FOR ONE SMALL METEOROLOGICAL SATELLITE WILL CONSIST OF APPROXIMATELY 3500 DCP STATIONS TO BE CONTACTED IN A 6-HR PERIOD. THE TOTAL AMOUNT OF DATA COLLECTED DURING THE 6-HR PERIOD WILL BE BETWEEN 350K AND 600K BITS, DEPENDING ON THE CODING TECHNIQUES. DATA RECEIVED FROM INDIVIDUAL STATIONS WILL VARY FROM 50 TO 3000 BITS, DEPENDING ON THE TYPE AND VARIETY OF SENSORS USED AT AN INDIVIDUAL DCP STATION.

----- SMS-C, WILLIAMS -----

EXPERIMENT NAME- ENERGETIC PARTICLE MONITOR

NSSDC ID- SMS-C -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A NUMBER OF SEPARATE SILICON SOLID-STATE DETECTORS, EACH WITH A TAILORED MODERATOR THICKNESS AND A SEPARATE ELECTRONICS UNIT FOR PULSE AMPLIFICATION AND PULSE-HEIGHT DISCRIMINATION, WILL BE USED TO OBTAIN THE FOLLOWING PARTICLE TYPE/ENERGY MEASUREMENTS -- SEVEN CHANNELS WILL MEASURE PROTONS IN THE RANGE 1 TO 500 MEV, SIX CHANNELS WILL MEASURE ALPHA PARTICLES IN THE RANGE 4 TO 400 MEV, AND ONE CHANNEL WILL MEASURE ELECTRONS GREATER THAN 0.5 MEV.

----- SMS-C, WILLIAMS -----

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NSSDC ID- SMS-C -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

THE PROPOSED X-RAY COUNTER WILL BE COMPOSED OF A COLLIMATOR, TWO IONIZATION CHAMBERS, AND TWO ELECTROMETERS. A SMALL ANGULAR APERTURE HAS BEEN CHOSEN FOR THE TELESCOPE COLLIMATOR, WHICH WILL BE MOUNTED SO THAT THE DECLINATION OF ITS AXIS CAN BE CONTROLLED BY GROUND COMMAND TO ENSURE THAT THE SUN IS VIEWED BY THE TELESCOPE ONCE DURING EVERY VEHICLE ROTATION. ONE ION CHAMBER WILL BE FILLED WITH ARGON AT 1 ATMOSPHERE FOR DETECTION OF 1- TO 8-A X RAYS, AND WILL HAVE A 5-MIL BERYLLIUM WINDOW TO EXCLUDE X RAYS OF LONGER WAVELENGTHS. THE OTHER CHAMBER WILL BE FILLED WITH XENON AT 1.5 TO 2 ATMOSPHERES AND WILL HAVE A 50-MIL BERYLLIUM WINDOW FOR MEASUREMENTS OF X RAYS IN THE WAVELENGTH RANGE 0.5- TO 3-A.

----- SMS-C, WILLIAMS -----

EXPERIMENT NAME- MAGNETIC FIELD MONITOR

NSSDC ID- SMS-C -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - D.J. WILLIAMS *****NOAA-ERL
BOULDER, CO

EXPERIMENT BRIEF DESCRIPTION

A BIAXIAL, CLOSED-LOOP, FLUXGATE MAGNETOMETER HAS BEEN SELECTED FOR THIS MONITOR. THE TWO SENSORS WILL BE ALIGNED AT RIGHT ANGLES TO ONE ANOTHER SO THAT AFTER MOUNTING ON A SHORT BODY (APPROXIMATELY 2 FT), ONE SENSOR WILL BE ALIGNED PARALLEL TO THE SPACECRAFT SPIN AXIS AND THE OTHER PERPENDICULAR TO THIS AXIS. EACH SENSOR WILL HAVE A SELECTABLE RANGE (+50, 100, 200, OR 400 GAMMAS), AN OFFSET FIELD CAPABILITY (PLUS OR MINUS 1200 GAMMAS IN 40-GAMMA STEPS), AND AN IN-FLIGHT CALIBRATION CAPABILITY.

***** SOLAR MAXIMUM MISSION *****

SPACECRAFT COMMON NAME- SOLAR MAXIMUM MISSION
ALTERNATE NAMES- SMN
NSSDC ID- SMN

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- MID 1978 SPACECRAFT WEIGHT- 1300. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR.

UNITED STATES

NASA-055

PLANNED ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC
 ORBIT PERIOD- 90. MIN INCLINATION- 28. DEG
 PERIAPSIS- 6828. KM ALT APOAPSIS- 6828. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PS - K.J. FROSTNASA-GSFC
 GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE SCIENTIFIC OBJECTIVE OF THIS MISSION IS THE STUDY OF SOLAR FLARES AND FLARE-RELATED PHENOMENA. THE SPACECRAFT WILL BE POINTED AT THE SUN CONTINUOUSLY DURING THE DAYLIGHT PORTION OF THE ORBIT. IT WILL BE SPACE-SHUTTLE-COMPATIBLE TO ALLOW THE CAPABILITY OF RETRIEVING THE SPACECRAFT, REFITTING AND REFURDISHING IT, AND RETURNING IT TO ORBIT. THE SPACECRAFT WILL BE OPERATED BY A SOLAR OBSERVATORY OPERATIONS CENTER LOCATED AT THE GODDARD SPACE FLIGHT CENTER, GREENBELT, MARYLAND. A SUBSTANTIAL GUEST INVESTIGATOR PROGRAM WILL BE SCHEDULED, TO ALLOW BROAD PARTICIPATION BY THE SCIENTIFIC COMMUNITY.

***** SOLRAD 9 *****

SPACECRAFT COMMON NAME- SOLRAD 9
 ALTERNATE NAMES- EXPLORER 37, 03141
 NSSDC ID- 68-017A

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
 AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/25/74.

LAUNCH DATE- 03/05/68 SPACECRAFT WEIGHT- 190. KG
 LAUNCH SITE- Wallops Flight Center, United States
 LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY

UNITED STATES NASA-055
 UNITED STATES DOD-NAVY

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 03/06/68
 ORBIT PERIOD- 98.68 MIN INCLINATION- 59.43 DEG
 PERIAPSIS- 513.000 KM ALT APOAPSIS- 881.000 KM ALT

RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 01/25/73
 ORBIT PERIOD- 90.025 MIN INCLINATION- 59.4082 DEG
 PERIAPSIS- 501. KM ALT APOAPSIS- 766. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PM - R.W. KREPLINUS NAVAL RESEARCH LAB
 WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION

THE NRL SOLRAD 9 SATELLITE WAS ONE OF A SERIES OF SATELLITES THAT BEGAN IN 1960 TO PROVIDE CONTINUOUS COVERAGE OF SOLAR RADIATION WITH A SET OF STANDARD PHOTOMETERS. SOLRAD 9 WAS A SPIN-STABILIZED SATELLITE ORIENTED WITH ITS SPIN AXIS PERPENDICULAR TO THE SUN-SATELLITE LINE SO THAT THE 14 SOLAR X-RAY AND UV PHOTOMETERS POINTING RADIIALLY OUTWARD FROM ITS EQUATORIAL OBLI VIEWED THE SUN WITH EACH REVOLUTION. DATA WERE SIMULTANEOUSLY TRANSMITTED VIA FM/AM TELEMETRY AND RECORDED IN A CORE MEMORY THAT READ OUT ITS CONTENTS ON COMMAND. INDIVIDUAL SCIENTISTS AND INSTITUTIONS ARE INVITED TO RECEIVE AND USE THE DATA TRANSMITTED ON THE 136-MHZ TELEMETRY BAND ON THE STANDARD IRIG CHANNELS 3 THROUGH 8.

----- SOLRAD 9, KREPLIN -----

EXPERIMENT NAME- SOLAR RADIATION DETECTORS

NSSDC ID- 68-017A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
 AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/25/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 OI - T.A. CHUBBUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 OI - H.D. FRIEDMANUS NAVAL RESEARCH LAB
 WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF 14 DETECTORS COVERING THE RANGES 20 TO 80 KEV, 0.5 TO 60 Å, AND 1080 TO 1350 Å. THE DETECTORS WERE DESIGNED TO MEASURE WAVELENGTH AND FLUX SHIFTS OF SOLAR RADIATION DURING PERIODS OF LOW AND HIGH SOLAR ACTIVITY. THE DETECTORS WERE STANDARDIZED PHOTOMETERS SIMILAR TO THOSE FLOWN ON SOLRAD 8. DATA FROM THREE PAIRS OF THESE DETECTORS COVERING THE RANGE 0.5 TO 16 Å WERE STORED IN THE ONBOARD MEMORY TO PROVIDE FULL TIME COVERAGE, WHILE THE OTHER DATA WERE TRANSMITTED IN REAL TIME ONLY. (REAL-TIME DATA WERE RECORDED FOR AT LEAST 10 MIN PER ORBIT.) THE UV AND 20- TO 80-KEV DETECTORS FAILED SHORTLY AFTER LAUNCH.

***** SOLRAD 10 *****

SPACECRAFT COMMON NAME- SOLRAD 10
 ALTERNATE NAMES- EXPLORER 44, SOLAR EXPLORER-C
 SE-C, SOLRAD-C
 PL-703A
 NSSDC ID- 71-058A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
 AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 07/00/73.

LAUNCH DATE- 07/00/71 SPACECRAFT WEIGHT- 260. KG
 LAUNCH SITE- Wallops Flight Center, United States
 LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY

UNITED STATES NASA-055
 UNITED STATES DOD-NAVY

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 07/09/71
 ORBIT PERIOD- 98.23 MIN INCLINATION- 58.06 DEG
 PERIAPSIS- 433.000 KM ALT APOAPSIS- 632.000 KM ALT

RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 01/20/73
 ORBIT PERIOD- 95.027 MIN INCLINATION- 51.0465 DEG
 PERIAPSIS- 435. KM ALT APOAPSIS- 577.0 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
 PM - E.W. PETERKINUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 PS - R.W. KREPLINUS NAVAL RESEARCH LAB
 WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION

SOLRAD 10, A SPIN-STABILIZED SATELLITE, WAS ONE IN A SERIES OF SPACECRAFT DESIGNED TO PROVIDE CONTINUOUS COVERAGE OF WAVELENGTH AND INTENSITY CHANGES IN SOLAR RADIATION IN THE UV, SOFT, AND HARD X-RAY REGIONS. THE FIRST SPACECRAFT IN THIS SERIES, SR-1, WAS LAUNCHED IN 1960. SOLRAD 10 ALSO MAPPED THE CELESTIAL SPHERE USING A HIGH-SENSITIVITY X-RAY DETECTOR. THE SPACECRAFT WAS A 12-SIDED CYLINDER THAT MEASURED 76 CM IN DIAMETER AND 88 CM IN HEIGHT. FOUR SYMMETRICALLY PLACED 17.4- BY 53.3-CM SOLAR CELL PANELS, HINGED AT THE CENTER SECTION OF THE STRUCTURE, SERVED AS THE ELEMENTS OF A TURNSTILE ANTENNA SYSTEM. EIGHTEEN SOLAR SENSORS WERE MOUNTED POINTING PARALLEL TO THE SPIN AXIS OF THE SATELLITE, WHICH POINTED DIRECTLY AT THE SOLAR DISK. THE PLANE OF ROTATION SHIFTED ABOUT 1 DEG/DAY SO THAT A STELLAR DETECTOR MOUNTED TO POINT RADIIALLY OUTWARD FROM THE AXIS SCANNED THE CELESTIAL SPHERE. THE EXPERIMENTS WERE TURNED ON AT 1430 UT ON JULY 9, 1971. DATA FROM ALL DETECTORS WERE STORED IN A 54-KBS CORE MEMORY AND TELEMETRED ON COMMAND TO THE NRL TRACKING STATION AT HUSSON PT., MD. THE FIRST CORE DUMP WAS OBTAINED AT 2100 UT ON JULY 9, 1971. DATA WERE ALSO TRANSMITTED IN REAL TIME AT 137.710 MHz. THE CORE MEMORY FAILED IN JULY, 1973. ONLY REAL-TIME DATA WERE TAKEN AFTER THAT TIME.

----- SOLRAD 10, KREPLIN -----

EXPERIMENT NAME- SOLAR RADIATION DETECTORS

NSSDC ID- 71-058A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
 AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 12/11/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
 OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 OI - D.D. BROUSSEAUUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 OI - E.T. BYRAMUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 OI - J.H. CARVERUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 OI - R.E. EISENHOWERUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 OI - G.G. FRITZUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 OI - D.M. HORANUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 OI - A.T. MCCLINTON, JR.WOLF RES & DEV CORP
 RIVERDALE, MD
 OI - R.G. TAYLORUS NAVAL RESEARCH LAB
 WASHINGTON, DC
 OI - J. WINKLERUS NAVAL RESEARCH LAB
 WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MONITOR THE SOLAR X-RAY FLUX IN EIGHT BANDS AND THE SOLAR UV FLUX IN FIVE BANDS AS PART OF A LONG-TERM PROJECT TO OBSERVE SOLAR X-RAY AND UV ACTIVITY WITH SETS OF STANDARDIZED SENSORS OVER AN ENTIRE SOLAR CYCLE. THE X-RAY BANDS OBSERVED WERE 0.08 TO 0.8 Å, 0.1 TO 1.6 Å, 0.5 TO 3 Å, 1 TO 5 Å, 1 TO 8 Å, 0.3 TO 20 Å, AND 44 TO 60 Å. ALL THE DETECTORS FOR THESE BANDS, WITH THE EXCEPTION OF THAT FOR THE 0.08- TO 0.8-Å BAND, WERE ION CHAMBERS FITTED WITH A VARIETY OF WINDOW MATERIAL (CERILLIUM, ALUMINUM, AND MYLAR) OF VARIOUS THICKNESSES AND FILLED WITH SEVERAL DIFFERENT GASES (KRYPTON, ARGON, NITROGEN, CARBON TETRACHLORIDE, AND XENON) AT VARIOUS PRESSURES. THE 0.08- TO 0.8-Å BAND HAD AS A DETECTOR A CESIUM IODIDE (NA) SCINTILLATING CRYSTAL SURROUNDED BY A PLASTIC SCINTILLATING MATERIAL VIEWED BY A SINGLE PHOTOMULTIPLIER. THIS DETECTOR WAS DESIGNED TO COLLECT DATA ON THE VERY-HIGH-ENERGY SOLAR X-RAY EMISSION OBSERVED ONLY DURING SOLAR FLARES. THE UV BANDS OBSERVED WERE 170 TO 500 Å, 170 TO 700 Å, 1000 TO 1350 Å, 1225 TO 1350 Å, AND 1450 TO 1600 Å. THE TWO SHORTER WAVELENGTH BANDS HAD LITHIUM FLUORIDE, PHOTOSENSITIVE SURFACES PROTECTED BY ALUMINUM, ALUMINUM OXIDE, AND CARBON WINDOWS FOR DETECTORS WHILE THE REMAINING BANDS HAD ION CHAMBERS WITH WINDOWS

COMPOSED OF LITHIUM FLUORIDE, CALCIUM FLUORIDE, OR SILICON DIOXIDE, AND VARIOUS GAS FILTERS (NITRIC OXIDE OR TRIETHYLAMINE O_2). SOME OF THE SOLAR DETECTORS WERE PROTECTED FROM CHARGED PARTICLES BY CONE-SHAPED ALUMINUM COLLIMATORS. THE DATA WERE TRANSMITTED OVER TWO TELEMETRY SYSTEMS IN ONE OF THREE FORMS -- STORED DATA, REAL-TIME DIGITAL (PCM) DATA, AND REAL-TIME ANALOG DATA. TELEMETRY SYSTEM 1 (TM 1) USED A PCM/PCM/PCM TRANSMITTER THAT OPERATED AT 137.710 MHZ WITH A RADIATED POWER OF 250 MW. UNDER NORMAL OPERATING CONDITIONS, TM 1 CONTINUOUSLY TRANSMITTED ANALOG AND PCM REAL-TIME DATA, ALTHOUGH THE REAL-TIME DIGITAL PCM WAS THE PRIMARY REAL-TIME TRANSMISSION FORMAT. TELEMETRY SYSTEM 2 (TM 2) USED A PCM/PCM TRANSMITTER THAT OPERATED AT 136.100 MHZ WITH A RADIATED POWER OF 250 MW. TM 2 TRANSMITTED STORED DATA (UP TO ONE DATA SAMPLE PER MINUTE FOR 14.25 HR) ON COMMAND.

----- SOLRAD 10, KREPLIN -----

EXPERIMENT NAME- ALL-SKY X-RAY SURVEY

NSSDC ID- 71-050A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 07/00/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO MAP THE SOURCES OF X-RAY EMISSION IN THE SKY IN THE 0.5- TO 15-A REGION. THE DETECTOR, MOUNTED ON THE SIDE OF THE SPACECRAFT, WAS A LARGE-AREA PROPORTIONAL COUNTER MOUNTED TO POINT RADially OUTWARD FROM THE SPIN AXIS, WHICH POINTED CONTINUALLY TOWARD THE SUN. THE DETECTOR WINDOW WAS MADE OF 1/8-IN-THICK MYLAR WITH AN EFFECTIVE AREA OF 100 SQ CM. THE GAS FILLER WAS A MIXTURE OF 0.45 ARGON, 0.45 XERON, AND 0.10 CARBON DIOXIDE MAINTAINED AT 4 LB/SQ CM. A COLLIMATOR LIMITED THE FIELD OF VIEW TO 8 DEG (FULL-WIDTH AT HALF-MAXIMUM) IN A PLANE CONTAINING THE SPIN AXIS AND 1 DEG (FWHM) IN THE PLANE PERPENDICULAR TO THE SPIN AXIS. CHARGED PARTICLE INFORMATION WAS PROVIDED BY PROPORTIONAL COUNTERS MOUNTED ON THREE SIDES OF THE X-RAY DETECTOR. ASPECT INFORMATION WAS PROVIDED BY A BLUE-SENSITIVE PHOTOMULTIPLIER CAPABLE OF DETECTING ALL FOURTH-MAGNITUDE AND NOT FIFTH-MAGNITUDE STARS. THE RESOLUTION OF THE ASPECT SYSTEM AND THE ACCURACY WITH WHICH THE EXPERIMENT COULD LOCATE X-RAY SOURCES WAS BETTER THAN PLUS OR MINUS 0.25 DEG. THE DETECTOR WAS CONNECTED TO A 400-CHANNEL PULSE TIME ANALYZER WHICH WAS SYNCHRONIZED WITH THE SPIN PERIOD TO GIVE A 2-DEG SPATIAL RESOLUTION IN THE SPIN DIRECTION. THE WHOLE CELESTIAL SPHERE WAS SURVEYED EVERY SIX MONTHS.

***** SOLRAD 11A *****

SPACECRAFT COMMON NAME- SOLRAD 11A
ALTERNATE NAMES- SRD-11A, SOLRAD H-Trip
SESP NO.NRL-111-0264, NRL-111
NSSDC ID- SRD-11A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 11/11/75 SPACECRAFT WEIGHT- 102.15 KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN 3C

SPONSORING COUNTRY/AGENCY
UNITED STATES DOD-NAVY

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 3140. MIN INCLINATION- 0. DEG
PERIAPSIS- 127622. KM ALT APOAPSIS- 127622. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - E.W. PETERLINUS NAVAL RESEARCH LAB
WASHINGTON, DC
PS - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION

SOLRAD 11A WILL BE ONE OF A PAIR OF IDENTICAL SATELLITES THAT WILL BE PLACED IN A CIRCULAR EQUATORIAL ORBIT OF 20 EARTH RADII. THE SATELLITES, WHICH WILL BE ORIENTED TOWARDS THE SUN, WILL PROVIDE 100 PERCENT REAL-TIME, CONTINUOUS MONITORING OF SOLAR X-RAY, UV, AND ENERGETIC PARTICLE EMISSIONS. EXPERIMENTS WILL INCLUDE ULTRAVIOLET ION CHAMBERS OBSERVING SOLAR X RAYS BETWEEN 0.1 AND 60 A, PROPORTIONAL COUNTERS AND SCINTILLATORS OBSERVING SOLAR X RAYS BETWEEN 2 AND 150 KEV, AN EUV DETECTOR COVERING THREE BANDS BETWEEN 170 AND 1000 A, A VARIABLE RESOLUTION ENERGY-FAST SPECTROMETER COVERING THE WAVELENGTH RANGE OF 1100 TO 1600 A (RESOLUTION - 1 TO 25 A), A SOLAR WIND MONITOR, SOLAR PROTON, ELECTRON, AND ALPHA PARTICLE MONITORS, TWO X-RAY POLARIMETERS (ONE UTILIZING BRAGG SCATTERING AND THE OTHER UTILIZING THOMPSON SCATTERING), A BRAGG SPECTROMETER OBSERVING MAGNESIUM-11 AND -12 LINES, A LARGE-AREA AURORAL X-RAY DETECTOR, AND A PASSIVELY COOLED SOLID-STATE X-RAY DETECTOR TO MEASURE BACKGROUND X-RAY EMISSIONS.

----- SOLRAD 11A, BLAKE -----

EXPERIMENT NAME- SOLAR PROTONS

NSSDC ID- SRD-11A-14

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.D. BLAKEAEROSPACE CORP
EL SEGUNDO, CA
OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

A PAIR OF IDENTICAL SENSORS WILL BE MOUNTED ON THE SPACECRAFT, WITH ONE ON THE SOLAR-ORIENTED SURFACE (THIS EXPERIMENT) AND ONE ON THE ANTISOLAR SURFACE (EXPERIMENT SRD-11A-23). EACH SENSOR WILL BE A TWO-ELEMENT COUNTER USING DISK-SHAPED SEMICONDUCTORS AS DETECTOR ELEMENTS, WITH SHIELDING MATERIAL IN FRONT OF AND BETWEEN THE TWO DETECTOR ELEMENTS. THE DETECTOR ELEMENTS WILL BE CONNECTED TO CHARGE-SENSITIVE AMPLIFIERS. COINCIDENCE AND PULSE HEIGHT ANALYSIS WILL BE USED TO SEPARATE PULSES PRODUCED BY 2-MEV PROTONS, 10-MEV PROTONS, 4.5-MEV ALPHA PARTICLES, 7.5-MEV ALPHA PARTICLES, AND HEAVY NUCLEI (2 GREATER THAN 2 GREATER THAN 3 MEV PER NUCLEON). A COMPLETE SET OF DATA POINTS WILL BE OBTAINED EVERY 2 MINUTES.

----- SOLRAD 11A, BLAKE -----

EXPERIMENT NAME- OMNIDIRECTIONAL PROTONS

NSSDC ID- SRD-11A-17

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.D. BLAKEAEROSPACE CORP
EL SEGUNDO, CA
OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO MEASURE SOLAR PROTONS AND ALPHA PARTICLES. A SET OF FIVE SMALL SILICON CUBICAL SEMICONDUCTOR DETECTORS WILL BE USED TO SEPARATELY MEASURE THE OMNIDIRECTIONAL PROTON AND ALPHA PARTICLE FLUXES IN THE ENERGY/NUCLEON RANGES 5 TO 20, 10 TO 25, 20 TO 40, 50 TO 90, AND 100 TO 160 MEV. A TWO-ELEMENT SEMICONDUCTOR TELESCOPE WILL USE COINCIDENCE REQUIREMENTS AND PULSE HEIGHT ANALYSIS TO DETERMINE PROTON FLUXES IN FIVE DIFFERENTIAL ENERGY CHANNELS FROM 20 TO 500 KEV AND IN THREE INTEGRAL CHANNELS AT 0.5, 1, AND 1.5 MEV. THE 36 TO 74 KEV DATA AND THE 1-MEV DATA WILL BE SECTORED INTO QUADRANTS WHILE THE REMAINING CHANNELS WILL YIELD SPIN-INTEGRATED DATA. THE INSTRUMENT WILL CONSIST OF A PHOTOMULTIPLIER TUBE VIEWING A THIN PLASTIC SCINTILLATOR FOIL. PULSE HEIGHT ANALYSIS WILL BE USED TO SEPARATE IONS INTO FIVE GROUPS (2 = 1, 2, 6 TO 10, 12 TO 18, AND GREATER THAN 18). THE IONS WILL HAVE ENERGY THRESHOLDS OF 0.5 MEV/NUCLEON (2 = 1 AND 2) THROUGH 0.6 MEV/NUCLEON (2 ABOVE 18). THE 2-6 AND 2-6 THROUGH 10 DATA WILL BE SECTORED INTO FOUR QUADRANTS. THE REMAINING DATA WILL BE SPIN INTEGRATED. A COMPLETE SET OF MEASUREMENTS WILL BE MADE ONCE EVERY 2 MIN.

----- SOLRAD 11A, BLAKE -----

EXPERIMENT NAME- ANTISOLAR PROTONS

NSSDC ID- SRD-11A-23

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.D. BLAKEAEROSPACE CORP
EL SEGUNDO, CA
OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

A PAIR OF IDENTICAL SENSORS WILL BE MOUNTED ON THE SPACECRAFT, WITH ONE ON THE ANTISOLAR SURFACE (THIS EXPERIMENT) AND ONE ON THE SOLAR-ORIENTED SURFACE (EXPERIMENT SRD-11A-14). EACH SENSOR WILL BE A TWO-ELEMENT COUNTER TELESCOPE USING DISK-SHAPED SEMICONDUCTORS AS DETECTOR ELEMENTS, WITH SHIELDING MATERIAL IN FRONT OF AND BETWEEN THE TWO DETECTOR ELEMENTS. THE DETECTOR ELEMENTS WILL BE CONNECTED TO CHARGE-SENSITIVE AMPLIFIERS. COINCIDENCE AND PULSE HEIGHT ANALYSIS WILL BE USED TO SEPARATE PULSES PRODUCED BY 2-MEV PROTONS, 10-MEV PROTONS, 4.5-MEV ALPHA PARTICLES, 7.5-MEV ALPHA PARTICLES, AND HEAVY NUCLEI (2 GREATER THAN 2, 2 GREATER THAN 3 MEV PER NUCLEON). A COMPLETE SET OF DATA POINTS WILL BE OBTAINED EVERY 2 MIN.

----- SOLRAD 11A, GYRAM -----

EXPERIMENT NAME- STELLAR/AURORAL X RAYS

NSSDC ID- SRD-11A-16

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - E.T. GYRAMUS NAVAL RESEARCH LAB
WASHINGTON, DC

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PROPORTIONAL COUNTERS SENSITIVE TO X RAYS BETWEEN 1 AND 0 A. THESE PROPORTIONAL COUNTERS WILL BE MOUNTED ON THE SIDE OF THE SATELLITE AND ORIENTED 45 DEG, 90 DEG, AND 135 DEG OFF THE SPIN AXIS. THE COUNTING CIRCUITS WILL BE CONTROLLED BY THE ROLL PERIOD AND SYNCHRONIZED TO THE STAR AND/OR EARTH PULSES SO THAT DATA SAMPLES CAN BE ASSOCIATED WITH PORTIONS OF THE SKY. THE STELLAR PORTION OF THIS EXPERIMENT WILL BE ABLE TO MAP COSMIC X-RAY SOURCES AND WILL SWEEP THE ENTIRE CELESTIAL SPHERE IN ABOUT 3 MONTHS. THE AURORAL PORTION OF THE EXPERIMENT WILL BE DESIGNED TO MONITOR AURORAL X-RAY EMISSIONS FROM THE EARTH. THE STELLAR PORTION SAMPLING CYCLE WILL TAKE 16 MIN, WHILE THE AURORAL PORTION WILL REQUIRE 2 MIN FOR A SAMPLING CYCLE.

----- SOLRAD 11A, DOSCHEK -----

EXPERIMENT NAME- THOMSON X-RAY POLARIMETER

NSSDC ID- SRD-11A-10

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.A. DOSCHEKUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

INCIDENT SOLAR X RAYS WILL BE SCATTERED BY A BLOCK OF LOW-DENSITY MATERIAL SUCH AS LITHIUM, LITHIUM HYDRIDE, OR BERYLLIUM. POLARIZED X RAYS WILL BE PREFERENTIALLY SCATTERED WHILE NON-POLARIZED X RAYS WILL BE SCATTERED ISOTROPICALLY. TWO PROPORTIONAL COUNTERS, EACH WITH A TWO-CHANNEL PULSE HEIGHT ANALYZER TO PROVIDE ENERGY RESOLUTION IN 2- TO 10-KEV AND 10- TO 50-KEV BANDS, WILL BE MOUNTED ON OPPOSITE SIDES OF THE SCATTERING BLOCK. AS THE SATELLITE ROLLS, THE SCATTERING BLOCK AND THE DETECTORS WILL BE ROTATED WITH RESPECT TO THE PLANE OF POLARIZATION OF THE INCIDENT X RAYS. THE DATA WILL BE GATED ELECTRONICALLY INTO ACCUMULATORS ASSOCIATED WITH 45-DEG SECTORS IN THE ROLL DIRECTION. CYCLIC PULSE-COUNT VARIATIONS FROM SECTOR TO SECTOR WILL REVEAL POLARIZATION IF PRESENT. THE DATA FROM THE 45-DEG SECTORS WILL BE ACCUMULATED FOR AN INTEGRAL NUMBER OF SPINS DURING EACH 30-SEC SAMPLING CYCLE AND THEN READ OUT ON COMMAND. A RADIOACTIVE SOURCE WILL SWING OUT BETWEEN EACH DETECTOR AND THE SCATTERING BLOCK FOR CALIBRATION IN FLIGHT.

----- SOLRAD 11A, FELDMAN -----

EXPERIMENT NAME- 1175- TO 1000-A SOLAR UV SPECTROMETER

NSSDC ID- SRD-11A-09

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P.D. FELDMANUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE A ROTATABLE GRATING, OPERATING IN FIRST ORDER TO MEASURE THE SOLAR ELECTROMAGNETIC SPECTRUM BETWEEN 1175 AND 1000 A. A PHOTOMULTIPLIER TUBE WILL DETECT RADIATION REFLECTED THROUGH AN OPTICAL SYSTEM FROM THE GRATING. TWO SCANNING RATES WILL BE AVAILABLE -- A FAST-RATE LOW-RESOLUTION MODE THE ENTIRE 625-A RANGE WILL BE COVERED IN 93.75 SEC, USING 25-A SEGMENTS FOR EACH DATA SAMPLE, AND A SLOW-RATE HIGH-RESOLUTION MODE IN WHICH THE 625-A RANGE WILL BE COVERED IN 12.5 MIN, USING 3.125-A SEGMENTS.

----- SOLRAD 11A, FRITZ -----

EXPERIMENT NAME- 15- TO 150-KEV SOLAR X-RAY MONITOR

NSSDC ID- SRD-11A-01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.G. FRITZUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE A CESIUM IODIDE SCINTILLATOR SURROUNDED BY A PLASTIC SCINTILLATOR OPERATED IN ANTICINCIDENCE TO SCREEN OUT BACKGROUND COUNTS. PULSE HEIGHT ANALYSIS WILL PROVIDE SOLAR SPECTRA IN THE RANGES FROM 15 TO 20, 20 TO 30, 30 TO 60, AND 60 TO 150 KEV. NORMALLY, DATA WILL BE TELEMETRED FROM EACH CHANNEL EVERY 7.5 SEC. ALTHOUGH AN OPTIONAL MODE WILL SELECT THE 20-TO-30-KEV CHANNEL FOR TRANSMISSION EVERY 1.075 SEC. INFILIGHT CALIBRATION WILL BE MADE USING A RADIOACTIVE SOURCE WHICH WILL SWING IN FRONT OF THE DETECTOR UPON COMMAND AND REMAIN THERE FOR A 2-MIN TELEMETRY CYCLE. THE OVERALL DETECTOR DESIGN IS THE SAME AS THAT USED ON SOLRAD 10, WITH IMPROVED ELECTRONICS.

----- SOLRAD 11A, FRITZ -----

EXPERIMENT NAME- X-RAY BACKGROUND

NSSDC ID- SRD-11A-24

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.G. FRITZUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R. LUCKEUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R.C. HENRYUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

A SOLID-STATE DETECTOR (GERMANIUM OR LITHIUM-DRIFTED SILICON) WILL BE USED TO MEASURE THE GALACTIC X-RAY BACKGROUND IN THE 0.5- TO 20-KEV RANGE WITH AN ENERGY RESOLUTION OF BETTER THAN 0.3 KEV. TO REACH THE DESIRED 0.3-KEV ENERGY RESOLUTION, THE DETECTOR MUST BE PASSIVELY COOLED TO 70- TO 100-DEG KELVIN. THE INSTRUMENT WILL BE MOUNTED ON THE ANTISOLAR SIDE OF THE SPACECRAFT, AND WILL SWEEP OUT A BAND NEARLY 20 DEG WIDE CENTERED NEAR THE ECLIPTIC PLANE AS THE SATELLITE MOVES AROUND THE SUN. THE DETECTOR OUTPUT WILL UNDERGO A 256-CHANNEL ANALYSIS TO PRODUCE THE ENERGY SPECTRUM. ALL 256 CHANNELS WILL BE READ OUT IN 16 MIN. A RADIOACTIVE SOURCE MOUNTED ON A SHUTTER WILL BE USED TO PROVIDE IN-FLIGHT CALIBRATION OF THE DETECTOR.

----- SOLRAD 11A, KELLEY -----

EXPERIMENT NAME- PROTON-ALPHA TELESCOPE

NSSDC ID- SRD-11A-20

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.G. KELLEYUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - L. KATZUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

TWO TOTALLY DEPLETED SILICON SURFACE BARRIER DETECTORS IN A COINCIDENCE TELESCOPE ARRANGEMENT WILL BE USED TO DETECT 1-TO 100-MEV PROTONS AND 10- TO 100-MEV ALPHA PARTICLES. PULSE HEIGHT ANALYSIS AND SUITABLE LOGIC ELEMENTS WILL BE USED TO PROVIDE 11 PROTON CHANNELS AND FOUR ALPHA PARTICLE CHANNELS. THE TELESCOPE WILL BE INSENSITIVE TO LIGHT AND TO ELECTRONS. VERY LITTLE FLUX DIRECTIONALITY INFORMATION WILL BE OBTAINED.

----- SOLRAD 11A, KELLEY -----

EXPERIMENT NAME- LOW-ENERGY PROTON SPECTROMETER

NSSDC ID- SRD-11A-21

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.G. KELLEYUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - L. KATZUSAF CAMBRIDGE RES LAB
BEDFORD, MA
OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

TWO TOTALLY DEPLETED SILICON SURFACE BARRIER DETECTORS MOUNTED IN A SERIES WILL MEASURE PROTONS BETWEEN 150 KEV AND 6 MEV. PULSE HEIGHT ANALYSIS OF PULSES GENERATED IN THE FRONT DETECTOR, WHICH ARE UNACCOMPANIED BY PULSES IN THE REAR DETECTOR, WILL SEPARATE THE PROTON COUNTS INTO 12 ENERGY CHANNELS. PERMANENT MAGNETS WILL BE USED TO DEFLECT AWAY INCIDENT ELECTRONS WITH ENERGIES LESS THAN 2 MEV. VERY LITTLE FLUX DIRECTIONALITY INFORMATION WILL BE OBTAINED.

----- SOLRAD 11A, KREPLIN -----

EXPERIMENT NAME- 1- TO 0-A SOLAR X-RAY MONITOR

NSSDC ID- SRD-11A-04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF TWO COMPLETE SETS OF IONIZATION-CHAMBER AND ELECTROMETER-AMPLIFIER COMBINATIONS. THE IONIZATION CHAMBERS WILL BE SENSITIVE TO SOLAR X RAYS IN THE 1- TO 0.4-RANGE. THE TWO SETS WILL BE DRIVEN BY SEPARATE POWER SUPPLIES, ALTHOUGH ONLY ONE SET WILL BE SELECTED FOR TELEMETRY TRANSMISSION. DATA WILL BE TRANSMITTED WITH A 15-SEC TIME RESOLUTION. THE ELECTROMETER-AMPLIFIERS WILL BE ABLE TO CHANGE RANGES AUTOMATICALLY OR MANUALLY. THE DETECTORS CANNOT BE CALIBRATED IN FLIGHT, BUT THE ELECTROMETER-AMPLIFIERS MAY BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

----- SOLRAD 11A, KREPLIN -----

EXPERIMENT NAME- 0- TO 16-A SOLAR X-RAY MONITOR

NSSDC ID- SRD-11A-05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF TWO COMPLETE SETS OF IONIZATION-CHAMBER AND ELECTROMETER-AMPLIFIER COMBINATIONS. THE IONIZATION CHAMBERS WILL BE SENSITIVE TO SOLAR X RAYS IN THE 0- TO 16-A RANGE. THE TWO SETS WILL BE DRIVEN BY SEPARATE POWER SUPPLIES, ALTHOUGH ONLY ONE SET WILL BE SELECTED FOR TELEMETRY TRANSMISSION. DATA WILL BE TRANSMITTED WITH A 30-SEC TIME RESOLUTION. THE ELECTROMETER-AMPLIFIERS WILL BE ABLE TO CHANGE RANGES AUTOMATICALLY OR MANUALLY. THE DETECTORS CANNOT BE CALIBRATED IN FLIGHT, BUT THE ELECTROMETER-AMPLIFIERS MAY BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

----- SOLRAD 11A, KREPLIN -----

EXPERIMENT NAME- 40- TO 60-A SOLAR X-RAY MONITOR

NSSDC ID- SRD-11A-06

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF TWO COMPLETE SETS OF IONIZATION-CHAMBER AND ELECTROMETER-AMPLIFIER COMBINATIONS. THE IONIZATION CHAMBERS WILL BE SENSITIVE TO SOLAR X-RAYS IN THE 40- TO 60-A RANGE. THE TWO SETS WILL BE DRIVEN BY SEPARATE POWER SUPPLIES, ALTHOUGH ONLY ONE SET WILL BE SELECTED FOR TELEMETRY TRANSMISSION. DATA WILL BE TRANSMITTED WITH A 30-SEC TIME RESOLUTION. THE ELECTROMETER-AMPLIFIERS WILL BE ABLE TO CHANGE RANGES AUTOMATICALLY OR MANUALLY. THE ELECTROMETER-AMPLIFIERS MAY BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR. THE DETECTORS CAN BE CALIBRATED IN FLIGHT BY COMMANDING A SHUTTER-MOUNTED RADIOACTIVE SOURCE INTO POSITION.

----- SOLRAD 11A, KREPLIN -----

EXPERIMENT NAME- 170- TO 1050-A SOLAR EUV MONITOR

NSSDC ID- SRD-11A-07

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE SETS OF LITHIUM-FLUORIDE PHOTOSENSITIVE SURFACE DETECTORS COUPLED TO FOUR-RANGE ELECTROMETER-AMPLIFIERS. THE THREE SETS WILL NOT BE REDUNDANT DUE TO THE DIFFERENT FILTERS BEING USED. A BERYLLIUM FILTER WILL LIMIT ONE DETECTOR'S RESPONSE TO WAVELENGTHS FROM 170 TO 300 Å. A TIN FILTER WILL LIMIT A SECOND DETECTOR'S RESPONSE TO WAVELENGTHS FROM 450 TO 850 Å. AN INDIUM FILTER WILL LIMIT THE THIRD DETECTOR'S RESPONSE TO WAVELENGTHS FROM 725 TO 1050 Å. THE DETECTOR-ELECTROMETER SETS WILL BE DRIVEN BY SEPARATE POWER SUPPLIES. EACH DETECTOR WILL BE READ EVERY 7.5 SEC. THE ELECTROMETERS MAY BE CALIBRATED DURING FLIGHT WITHOUT DETACHING THE DETECTOR ALTHOUGH THE DETECTORS CANNOT BE CALIBRATED IN FLIGHT.

----- SOLRAD 11A, KREPLIN -----

EXPERIMENT NAME- 1080- TO 1350-A SOLAR UV MONITOR

NSSDC ID- SRD-11A-08

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF ONE 4-RANGE ELECTROMETER-AMPLIFIER AND THREE IONIZATION CHAMBERS. TWO OF THE IONIZATION CHAMBERS WILL BE THE STANDARD GAS-FILLED CHAMBERS FLOWN ON PREVIOUS SOLRAD SATELLITES. THESE DETECTORS, ELECTRONICALLY AND MECHANICALLY PAIRED, WILL BE DESIGNATED AS DETECTOR 'A'. THE THIRD IONIZATION CHAMBER WILL BE AN EVACUATED CHAMBER WITH A LITHIUM FLUORIDE PHOTOSENSITIVE SURFACE, AND WILL BE DESIGNATED AS DETECTOR 'B'. NORMALLY, DETECTOR B WILL BE CONTINUOUSLY SELECTED FOR TELEMETRY TRANSMISSION AND WILL BE REPLACED ONLY OCCASIONALLY BY DETECTOR A FOR CALIBRATING B AND EXPERIMENT 9. A MECHANICAL SHUTTER, MOVABLE BY COMMAND, WILL SHIELD THE WINDOW OF B FROM THE SUN. THE ELECTROMETER-AMPLIFIER CAN BE CALIBRATED WITHOUT DETACHING THE DETECTOR FROM THE DETECTOR SYSTEM. DATA WILL BE SAMPLED AT 15-SEC INTERVALS.

----- SOLRAD 11A, KREPLIN -----

EXPERIMENT NAME- 0.5- TO 3-A SOLAR X-RAY MONITOR

NSSDC ID- SRD-11A-12

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE IONIZATION CHAMBERS CONNECTED IN PARALLEL TO A SINGLE ELECTROMETER-AMPLIFIER. THE IONIZATION CHAMBERS WILL BE SENSITIVE TO SOLAR X RAYS IN THE 0.5- TO 3.0-A RANGE. DATA WILL BE TRANSMITTED WITH A 15-SEC TIME RESOLUTION. THE ELECTROMETER-AMPLIFIER WILL BE ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTORS CANNOT BE CALIBRATED IN FLIGHT, BUT THE ELECTROMETER-AMPLIFIER MAY BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

----- SOLRAD 11A, KREPLIN -----

EXPERIMENT NAME- 1- TO 20-A SOLAR X-RAY MONITOR

NSSDC ID- SRD-11A-13

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN IONIZATION CHAMBER AND ONE ELECTROMETER-AMPLIFIER. THE IONIZATION CHAMBER WILL BE SENSITIVE TO SOLAR X-RAYS IN THE 1- TO 20-A RANGE. DATA WILL BE TRANSMITTED WITH A 30-SEC TIME RESOLUTION. THE ELECTROMETER-AMPLIFIER WILL BE ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTOR CANNOT BE CALIBRATED IN FLIGHT, BUT THE ELECTROMETER-AMPLIFIER MAY BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

----- SOLRAD 11A, MECKINS -----

EXPERIMENT NAME- CONTINUUM (0.0 Å) AND MAGNESIUM LINE
(9.17 Å AND 8.42 Å) MONITOR

NSSDC ID- SRD-11A-03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.F. MECKINSUS NAVAL RESEARCH LAB
WASHINGTON, DC

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

EXPERIMENT BRIEF DESCRIPTION

SOLAR X RAYS WILL BE OBSERVED IN THE MAGNESIUM-11 AND-13 LINES (9.17 A AND 0.42 A) AND IN THE CONTINUUM AT 8.0 A. THREE SHA CRYSTALS FIXED AT THREE DIFFERENT ANGLES WILL ALLOW SOLAR X RAYS TO UNDERGO FIRST-ORDER BRAGG REFLECTION INTO THREE PROPORTIONAL COUNTERS. SHOULD THE SPACECRAFT SPIN AXIS BECOME IMPROPERLY ORIENTED, THE SPECTROMETER WOULD FUNCTION PROPERLY IF THE ASPECT ANGLE WERE NO MORE THAN 1 DEG OFF NOMINAL. ALTHOUGH THE INSTRUMENT WOULD THEN FUNCTION AS A SCANNING SPECTROMETER WITH AN EXTREMELY SMALL SPECTRAL RANGE IN THE VICINITY OF THE TARGET WAVELENGTHS, DATA WILL BE ACCUMULATED OVER INTERVALS OF 1/64 OF A SPACECRAFT'S SPIN PERIOD, AND THE EXPERIMENT WILL HAVE A SAMPLING CYCLE OF APPROXIMATELY 1-MIN DURATION.

----- SOLRAD 11A, MEEKINS -----

EXPERIMENT NAME- DRAGG X-RAY POLARIMETER

NSSDC ID- SRD-11A-11

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.F. MEEKINSUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL UTILIZE A LITHIUM FLUORIDE CRYSTAL, FIXED AT AN ANGLE TO ALLOW SOLAR X RAYS OF ABOUT 2.8 A TO UNDERGO FIRST-ORDER BRAGG REFLECTION INTO A PROPORTIONAL COUNTER. SINCE THE REFLECTION OF POLARIZED RADIATION DEPENDS UPON THE ANGLE BETWEEN THE ELECTRIC VECTOR OF THE RADIATION AND THE REFLECTING ANGLE OF THE CRYSTAL, THE SPIN OF THE SATELLITE WILL MODULATE THE INTENSITY OF REFLECTED POLARIZED RADIATION. DATA PULSES ASSOCIATED WITH 45-DEG SECTORS IN THE ROLL DIRECTION WILL BE ELECTRONICALLY GATED INTO CORRESPONDING ACCUMULATORS. SIGNAL VARIATIONS FROM SECTOR TO SECTOR WILL INDICATE THE PRESENCE OF POLARIZED RADIATION. DATA FOR EACH 45-DEG SECTOR WILL BE ACCUMULATED FOR AN INTEGRAL NUMBER OF SPINS AND READ OUT ONCE IN EACH 2-MIN TELEMETRY CYCLE.

----- SOLRAD 11A, SMATHERS -----

EXPERIMENT NAME- X-RAY MONITOR (0.1-1.6 A, 0.5-3 A,
1-4 A)

NSSDC ID- SRD-11A-02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.W. SMATHERSUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

FOUR ELECTRONICALLY PAIRED GAS-FILLED PROPORTIONAL COUNTERS WILL BE USED TO MEASURE X-RAY EMISSION BETWEEN 4 AND 100 KEV IN FOUR CHANNELS. ALL FOUR DETECTORS WILL HAVE 10-MIL BERYLLIUM WINDOWS PLUS ADDITIONAL ALUMINUM OR BERYLLIUM MATERIAL MOUNTED IN FRONT OF THE DETECTORS. EACH DETECTOR WILL BE SAMPLED ONCE EVERY 7.5 SEC, OR TWO DETECTORS, EFFECTIVELY TRANSMIT DATA FROM ONLY ONE OF TWO DETECTORS, EFFECTIVELY QUADRUPLE OR DOUBLING THE SAMPLING RATE OF THAT DETECTOR. IN-FLIGHT CALIBRATION WILL BE PERFORMED USING A RADIOACTIVE SOURCE WHICH CAN BE MOVED IN FRONT OF THE DETECTORS UPON COMMAND.

----- SOLRAD 11A, VAMPOLA -----

EXPERIMENT NAME- SOLAR FLARE ELECTRONS

NSSDC ID- SRD-11A-22

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.L. VAMPOLAAEROSPACE CORP
EL SEGUNDO, CA

OI - J.B. BLAKEAEROSPACE CORP
EL SEGUNDO, CA

OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE SOLAR ELECTRONS. TWO PERMANENT MAGNETS WILL BE USED TO MOMENTUM-ANALYZE INCIDENT ELECTRONS. ARRAYS OF SILICON DETECTORS WILL COUNT INCIDENT ELECTRONS IN 12 ENERGY CHANNELS FROM 11 KEV TO 1.5 MEV. SPIN-INTEGRATED DATA WILL BE OBTAINED ONCE EVERY 3 MIN, EXCEPT THAT 11-KEV AND 405-KEV DATA WILL BE SECTORED INTO QUADRANTS, AND 50-KEV AND 610-KEV DATA WILL BE OBTAINED WITH 15-SEC RESOLUTION.

----- SOLRAD 11A, WELLER, JR. -----

EXPERIMENT NAME- GEOCORONAL-EXTRATERRESTRIAL EUV -
DETECTOR 1

NSSDC ID- SRD-11A-10

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.S. WELLER, JR.US NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

A COLLIMATED CHANNELTRON PHOTOMULTIPLIER MOUNTED BEHIND A FILTER WHEEL WILL BE USED TO MEASURE EUV RADIATION FROM NON-SOLAR SOURCES. THE FILTER WHEEL WILL ALLOW VARIOUS EMISSION LINES BETWEEN 200- AND 1400-A TO BE ISOLATED, AS WELL AS ALLOWING IN-FLIGHT CALIBRATION THROUGH THE USE OF A RADIOACTIVE SOURCE. THE DETECTOR WILL BE MOUNTED TO LOOK 90 DEG OFF THE SPIN AXIS OF THE SPACECRAFT AND WILL SWEEP THE CELESTIAL SPHERE IN ABOUT SIX MONTHS. EACH DATA SAMPLE WILL BE ACCUMULATED OVER INCREMENTS OF 1/64 OF THE SPACECRAFT'S SPIN, WITH THE SAMPLE SOURCE REFERENCED TO EITHER A STAR PULSE OR THE EARTH PULSE. THE DATA WILL BE READ OUT IN 2-MIN INTERVALS. THIS EXPERIMENT IS NOT EXPECTED TO BE OPERATED MORE THAN 1 HR PER DAY.

----- SOLRAD 11A, WELLER, JR. -----

EXPERIMENT NAME- GEOCORONAL-EXTRATERRESTRIAL EUV -
DETECTOR 2

NSSDC ID- SRD-11A-19

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.S. WELLER, JR.US NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

A COLLIMATED CHANNELTRON PHOTOMULTIPLIER MOUNTED BEHIND A FILTER WHEEL WILL BE USED TO MEASURE EUV RADIATION FROM NON-SOLAR SOURCES. THE FILTER WHEEL WILL ALLOW VARIOUS EMISSION LINES BETWEEN 200- AND 1400-A TO BE ISOLATED, AS WELL AS ALLOWING IN-FLIGHT CALIBRATION THROUGH THE USE OF A RADIOACTIVE SOURCE. THE DETECTOR WILL BE MOUNTED TO LOOK 90 DEG OFF THE SPIN AXIS OF THE SPACECRAFT AND WILL SWEEP THE CELESTIAL SPHERE IN ABOUT 6 MONTHS. EACH DATA SAMPLE WILL BE ACCUMULATED OVER INCREMENTS OF 1/64 OF THE SPACECRAFT'S SPIN, WITH THE SAMPLE SOURCE REFERENCED TO EITHER A STAR PULSE OR THE EARTH PULSE. THE DATA WILL BE READ OUT IN 2-MIN INTERVALS. THIS EXPERIMENT IS NOT EXPECTED TO BE OPERATED MORE THAN 1 HR PER DAY.

***** SOLRAD 11B *****

SPACECRAFT COMMON NAME- SOLRAD 11B

ALTERNATE NAME- SOLRAD HI-TRIP, NRL-111

PL-723F, SESP NO.NRL-111-C264

SOLRAD HI

NSSDC ID- SRD-11B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 11/11/75 SPACECRAFT WEIGHT- 102.15 KG

LAUNCH SITE- CAPE CANAVERAL, UNITED STATES

LAUNCH VEHICLE- TITAN 3C

SPONSORING COUNTRY/AGENCY
UNITED STATES OOD-NAVY

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC INCLINATION- 0. DEG
ORBIT PERIOD- 3140. MIN APDAPSIS- 127622. KM ALT
PERIAPSIS- 127622. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - E.W. PETERLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

PS - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

SPACECRAFT BRIEF DESCRIPTION

SOLRAD 11B WILL BE ONE OF A PAIR OF IDENTICAL SATELLITES THAT WILL BE PLACED IN A CIRCULAR EQUATORIAL ORBIT OF 20 EARTH RADII. THE SATELLITES, WHICH WILL BE ORIENTED TOWARD THE SUN, WILL PROVIDE 100 PERCENT REAL-TIME, CONTINUOUS MONITORING OF SOLAR X-RAY, UV, AND ENERGETIC PARTICLE EMISSIONS. EXPERIMENTS WILL INCLUDE BROADBAND ION CHAMBERS OBSERVING SOLAR X RAYS BETWEEN 0.1 AND 60 A, PROPORTIONAL COUNTERS AND SCINTILLATORS OBSERVING SOLAR X RAYS BETWEEN 2 AND 150 KEV, AN EUV DETECTOR COVERING THREE BANDS BETWEEN 170 AND 1000 A, A VARIABLE RESOLUTION EBERT-FASTIE SPECTROMETER COVERING THE WAVELENGTH RANGE OF 1100 TO 1600 A (RESOLUTION - 1 TO 25 A), A SOLAR WIND MONITOR, SOLAR PROTON, ELECTRON, AND ALPHA PARTICLE MONITORS, TWO X-RAY POLARIMETERS (ONE UTILIZING DRAGG SCATTERING AND THE OTHER UTILIZING THOMPSON SCATTERING), A DRAGG SPECTROMETER OBSERVING MAGNESIUM-11 AND -12 LINES, A LARGE-AREA AURORAL X-RAY DETECTOR, AND A PASSIVELY COOLED SOL10-STATE X-RAY DETECTOR TO MEASURE BACKGROUND X-RAY EMISSIONS.

----- SOLRAD 11B, BLAKE -----

EXPERIMENT NAME- SOLAR PROTONS

NSSDC ID- SRD-11B-14

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.B. BLAKEAFROSPACE CORP
EL SEGUNDO, CA
OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION
A PAIR OF IDENTICAL SENSORS WILL BE MOUNTED ON THE SPACECRAFT, WITH ONE ON THE SOLAR-ORIENTED SURFACE (THIS EXPERIMENT) AND ONE ON THE ANTISOLAR SURFACE (EXPERIMENT SRD-110-23). EACH SENSOR WILL BE A TWO-ELEMENT COUNTER TELESCOPE USING DISK-SHAPED SEMICONDUCTORS AS DETECTOR ELEMENTS, WITH SHIELDING MATERIAL IN FRONT OF AND BETWEEN THE TWO DETECTOR ELEMENTS. THE DETECTOR ELEMENTS WILL BE CONNECTED TO CHARGE-SENSITIVE AMPLIFIERS, COINCIDENCE AND PULSE HEIGHT ANALYSIS WILL BE USED TO SEPARATE PULSES PRODUCED BY 2-MEV PROTONS, 10-MEV PROTONS, 4.5-MEV ALPHA PARTICLES, 7.5-MEV ALPHA PARTICLES, AND HEAVY NUCLEI (Z GREATER THAN 2, > GREATER THAN 3 MEV PER NUCLEON). A COMPLETE SET OF DATA POINTS WILL BE OBTAINED EVERY 2 MIN.

----- SOLRAD 110, BLAKE -----

EXPERIMENT NAME- OMNIDIRECTIONAL PROTONS

NSSDC ID- SRD-110-17

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.B. BLAKEAFROSPACE CORP
EL SEGUNDO, CA
OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT WILL BE ABLE TO MEASURE SOLAR PROTONS AND ALPHA PARTICLES. A SET OF FIVE SMALL SILICON CUBICAL SEMICONDUCTOR DETECTORS WILL BE USED TO SEPARATELY MEASURE THE OMNIDIRECTIONAL PROTON AND ALPHA PARTICLE FLUXES IN THE ENERGY/NUCLEON RANGES 5 TO 20, 10 TO 25, 20 TO 40, 30 TO 90, AND 100 TO 160 MEV. A TWO-ELEMENT SEMICONDUCTOR TELESCOPE WILL USE COINCIDENCE REQUIREMENTS AND PULSE HEIGHT ANALYSIS TO DETERMINE PROTON FLUXES IN FIVE DIFFERENTIAL ENERGY CHANNELS FROM 20 TO 500 KEV AND IN THREE INTEGRAL CHANNELS AT 0.5, 1, AND 1.5 MEV. THE 36- TO 74-KEV AND THE 1-MEV DATA WILL BE SECTORED INTO QUADRANTS WHILE THE REMAINING CHANNELS WILL YIELD SPIN-INTEGRATED DATA. THE INSTRUMENT WILL CONSIST OF A PHOTOMULTIPLIER TUBE VIEWING A THIN PLASTIC SCINTILLATOR FOIL. PULSE HEIGHT ANALYSIS WILL BE USED TO SEPARATE IONS INTO FIVE GROUPS -- 2 EQUAL TO 1, 2, 6 TO 10, 12 TO 18, AND GREATER THAN 18. THE IONS WILL HAVE ENERGY THRESHOLDS OF 0.5 MEV/NUCLEON (2 EQUAL TO 1 OR 2) THROUGH 0.8 MEV/NUCLEON (2 GREATER THAN 18). THE 2-2 AND 7-8 THROUGH 10 DATA WILL BE SECTORED INTO FOUR QUADRANTS. THE REMAINING DATA WILL BE SPIN INTEGRATED. A COMPLETE SET OF MEASUREMENTS WILL BE MADE ONCE EVERY 2 MIN.

----- SOLRAD 110, BLAKE -----

EXPERIMENT NAME- ANTISOLAR PROTONS

NSSDC ID- SRD-110-23

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J.B. BLAKEAFROSPACE CORP
EL SEGUNDO, CA
OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION
A PAIR OF IDENTICAL SENSORS WILL BE MOUNTED ON THE SPACECRAFT, ONE ON THE ANTISOLAR SURFACE (THIS EXPERIMENT) AND ONE ON THE SOLAR-ORIENTED SURFACE (EXPERIMENT SRD-110-14). EACH SENSOR WILL BE A TWO-ELEMENT COUNTER TELESCOPE USING DISK-SHAPED SEMICONDUCTORS AS DETECTOR ELEMENTS, WITH SHIELDING MATERIAL IN FRONT OF AND BETWEEN THE TWO DETECTOR ELEMENTS. THE DETECTOR ELEMENTS WILL BE CONNECTED TO CHARGE-SENSITIVE AMPLIFIERS. COINCIDENCE ANALYSIS AND PULSE HEIGHT ANALYSIS WILL BE USED TO SEPARATE PULSES PRODUCED BY 2-MEV PROTONS, 10-MEV PROTONS, 4.5-MEV ALPHA PARTICLES, 7.5-MEV ALPHA PARTICLES, AND HEAVY NUCLEI (Z GREATER THAN 2). WITH > GREATER THAN 3 MEV PER NUCLEON. A COMPLETE SET OF DATA POINTS WILL BE OBTAINED EVERY 2 MINUTES.

----- SOLRAD 110, BYRAM -----

EXPERIMENT NAME- STELLAR/AURORAL X RAYS

NSSDC ID- SRD-110-16

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - E.T. BYRAMUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - D.M. HORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE PROPORTIONAL COUNTERS SENSITIVE TO X RAYS BETWEEN 1 AND 8 A. THESE PROPORTIONAL COUNTERS WILL BE MOUNTED ON THE SIDE OF THE SATELLITE AND ORIENTED 45 DEG, 90 DEG, AND 135 DEG OFF THE SPIN AXIS. THE COUNTING CIRCUITS WILL BE CONTROLLED BY THE ROLL PERIOD AND SYNCHRONIZED TO THE STAR AND/OR EARTH PULSES SO DATA SAMPLES CAN BE ASSOCIATED WITH PORTIONS OF THE SKY. THE STELLAR PORTION OF THIS EXPERIMENT WILL BE ABLE TO MAP COSMIC X-RAY SOURCES AND SWEEP THE ENTIRE CELESTIAL SPHERE IN ABOUT 6 MONTHS. THE AURORAL PORTION OF THE EXPERIMENT IS DESIGNED TO MONITOR AURORAL X-RAY EMISSIONS FROM THE EARTH. THE STELLAR PORTION SAMPLING CYCLE WILL REQUIRE 16 MIN WHILE THE AURORAL PORTION WILL REQUIRE 2 MIN FOR A SAMPLING CYCLE.

----- SOLRAD 110, DOSCHEX -----

EXPERIMENT NAME- THOMSON X-RAY POLARIMETER

NSSDC ID- SRD-110-10

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G.A. DOSCHEXUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

INCIDENT SOLAR X-RAYS WILL BE SCATTERED BY A BLOCK OF LOW-DENSITY MATERIAL SUCH AS LITHIUM, LITHIUM HYDRIDE, OR BERYLLIUM. POLARIZED X RAYS WILL BE PREFERENTIALLY SCATTERED WHILE NON-POLARIZED X RAYS WILL BE SCATTERED ISOTROPICALLY. TWO PROPORTIONAL COUNTERS, EACH WITH TWO-CHANNEL PULSE HEIGHT ANALYZERS TO PROVIDE ENERGY RESOLUTION IN 2- TO 10-KEV AND 10- TO 50-KEV BANDS, WILL BE MOUNTED ON OPPOSITE SIDES OF THE SCATTERING BLOCK. AS THE SATELLITE ROLLS, THE SCATTERING BLOCK AND THE DETECTORS WILL BE ROTATED WITH RESPECT TO THE PLANE OF POLARIZATION OF THE INCIDENT X RAYS. THE DATA WILL BE GATED ELECTRONICALLY INTO ACCUMULATORS ASSOCIATED WITH 45-DEG SECTORS IN THE ROLL DIRECTION. CYCLIC PULSE-COUNT VARIATIONS FROM SECTOR TO SECTOR WILL REVEAL POLARIZATION IF PRESENT. THE DATA FROM THE 45-DEG SECTORS WILL BE ACCUMULATED FOR AN INTEGRAL NUMBER OF SPINS DURING EACH 30-SEC SAMPLING CYCLE AND THEN READ OUT ON COMMAND. A RADIOACTIVE SOURCE WILL SWING OUT BETWEEN EACH DETECTOR AND THE SCATTERING BLOCK FOR CALIBRATION IN FLIGHT.

----- SOLRAD 110, FELDMAN -----

EXPERIMENT NAME- 1175- TO 1800-A SOLAR UV SPECTROMETER

NSSDC ID- SRD-110-09

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - P.D. FELDMANUS NAVAL RESEARCH LAB
WASHINGTON, DC
OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE A ROTATABLE GRATING, OPERATING IN FIRST ORDER TO MEASURE THE SOLAR ELECTROMAGNETIC SPECTRUM BETWEEN 1175 AND 1800 A. A PHOTOMULTIPLIER TUBE WILL DETECT RADIATION REFLECTED THROUGH AN OPTICAL SYSTEM FROM THE GRATING. TWO SCANNING RATES WILL BE AVAILABLE -- A FAST-RATE LOW-RESOLUTION MODE IN WHICH THE ENTIRE 620-A RANGE WILL BE COVERED IN 93.75 SECONDS, USING 25-A SEGMENTS FOR EACH DATA SAMPLE, AND A SLOW-RATE HIGH-RESOLUTION MODE IN WHICH THE 625-A RANGE WILL BE COVERED IN 12.6 MINUTES, USING 3.125-A SEGMENTS.

----- SOLRAD 110, FRITZ -----

EXPERIMENT NAME- 15- TO 150-KEV SOLAR X-RAY MONITOR

NSSDC ID- SRD-110-01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G.G. FRITZUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL USE A CESIUM IODIDE SCINTILLATOR SURROUNDED BY A PLASTIC SCINTILLATOR OPERATED IN ANTICOINCIDENCE TO SCREEN OUT BACKGROUND COUNTS. PULSE HEIGHT ANALYSIS WILL PROVIDE SOLAR SPECTRA IN THE RANGES FROM 15 TO 20, 20 TO 30, 30 TO 60, AND 60 TO 150 KEV. NORMALLY, DATA WILL BE TELEMETERED FROM EACH CHANNEL EVERY 7.5 SEC. ALTHOUGH AN OPTIONAL MODE CAN SELECT THE 20 TO 30-KEV CHANNEL FOR TRANSMISSION EVERY 1.875 SEC. IN-FLIGHT CALIBRATION WILL BE MADE USING A RADIOACTIVE SOURCE WHICH WILL SWING IN FRONT OF THE DETECTOR UPON COMMAND AND REMAIN THERE FOR A 2-MIN TELEMETRY CYCLE. THE OVERALL DESIGN IS THE SAME AS THAT USED ON SOLRAD 10, WITH IMPROVED ELECTRONICS.

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

----- SOLRAD 110, FRITZ -----

EXPERIMENT NAME- X-RAY BACKGROUND

NSSDC ID- SRD-110-24

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - G.G. FRITZUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - R. LUCKEUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - R.C. HENPYUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

A SOLID-STATE DETECTOR (GERMANIUM OR LITHIUM-DRIED SILICON) WILL BE USED TO MEASURE THE GALACTIC X-RAY BACKGROUND IN THE 0.5- TO 20-KEV RANGE WITH AN ENERGY RESOLUTION OF BETTER THAN 0.3 KEV. TO REACH THE DESIRED 0.3-KEV ENERGY RESOLUTION, THE DETECTOR MUST BE PASSIVELY COOLED TO 70- TO 100-DEG KELVIN. THE INSTRUMENT WILL BE MOUNTED ON THE ANTISOLAR SIDE OF THE SPACECRAFT AND WILL SWEEP OUT A BAND NEARLY 20-DEG WIDE CENTERED NEAR THE ECLIPTIC PLANE AS THE SATELLITE MOVES AROUND THE SUN. THE DETECTOR OUTPUT WILL UNDERGO 256-CHANNEL ANALYSIS TO PRODUCE THE ENERGY SPECTRUM. ALL 256 CHANNELS WILL BE READ OUT IN 16 MIN. A RADIOACTIVE SOURCE MOUNTED ON A SHUTTER WILL BE USED TO PROVIDE IN-FLIGHT CALIBRATION OF THE DETECTOR.

----- SOLRAD 110, KELLEY -----

EXPERIMENT NAME- PROTON-ALPHA TELESCOPE

NSSDC ID- SRD-110-20

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.G. KELLEYUSAF CAMBRIDGE RES LAB
BEDFORD, MA

OI - L. KATZUSAF CAMBRIDGE RES LAB
BEDFORD, MA

OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

TWO TOTALLY DEPLETED SILICON SURFACE-BARRIER DETECTORS IN A COINCIDENCE TELESCOPE ARRANGEMENT WILL BE USED TO DETECT 1- TO 100-MEV PROTONS AND 10- TO 100-MEV ALPHA PARTICLES. PULSE HEIGHT ANALYSIS AND SUITABLE LOGIC ELEMENTS WILL BE USED TO PROVIDE 11 PROTON CHANNELS AND FOUR ALPHA PARTICLE CHANNELS. THE TELESCOPE WILL BE INSENSITIVE TO LIGHT AND TO ELECTRONS. VERY LITTLE FLUX DIRECTIONALITY INFORMATION WILL BE OBTAINED.

----- SOLRAD 110, KELLEY -----

EXPERIMENT NAME- LOW-ENERGY PROTON SPECTROMETER

NSSDC ID- SRD-110-21

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.G. KELLEYUSAF CAMBRIDGE RES LAB
BEDFORD, MA

OI - L. KATZUSAF CAMBRIDGE RES LAB
BEDFORD, MA

OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

TWO TOTALLY DEPLETED SILICON SURFACE BARRIER DETECTORS MOUNTED IN A SERIES WILL MEASURE PROTONS BETWEEN 150 KEV AND 6 MEV. PULSE HEIGHT ANALYSIS OF PULSES GENERATED IN THE FRONT DETECTOR WHICH ARE UNACCOMPANIED BY PULSES IN THE REAR DETECTOR WILL SEPARATE THE PROTON COUNTS INTO 12 ENERGY CHANNELS. PERMANENT MAGNETS WILL BE USED TO DEFLECT AWAY INCIDENT ELECTRONS WITH ENERGIES LESS THAN 2 MEV. VERY LITTLE FLUX DIRECTIONALITY INFORMATION WILL BE OBTAINED.

----- SOLRAD 110, KREPLIN -----

EXPERIMENT NAME- 1- TO 8-A SOLAR X-RAY MONITOR

NSSDC ID- SRD-110-04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF TWO COMPLETE SETS OF IONIZATION-CHAMBER AND ELECTROMETER-AMPLIFIER COMBINATIONS. THE IONIZATION CHAMBERS WILL BE SENSITIVE TO SOLAR X RAYS IN THE 1- TO 8-A RANGE. THE TWO SETS WILL BE DRIVEN BY SEPARATE POWER SUPPLIES. ALTHOUGH ONLY ONE SET WILL BE SELECTED FOR TELEMETRY TRANSMISSION, DATA WILL BE TRANSMITTED WITH A 10-SEC TIME RESOLUTION. THE ELECTROMETER-AMPLIFIERS WILL BE ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTORS CANNOT BE CALIBRATED IN FLIGHT, BUT THE ELECTROMETER-AMPLIFIERS MAY BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

----- SOLRAD 110, KREPLIN -----

EXPERIMENT NAME- 0- TO 16-A SOLAR X-RAY MONITOR

NSSDC ID- SRD-110-05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF TWO COMPLETE SETS OF IONIZATION-CHAMBER AND ELECTROMETER-AMPLIFIER COMBINATIONS. THE IONIZATION CHAMBERS WILL BE SENSITIVE TO SOLAR X-RAYS IN THE 0- TO 16-A RANGE. THE TWO SETS WILL BE DRIVEN BY SEPARATE POWER SUPPLIES. ALTHOUGH ONLY ONE SET WILL BE SELECTED FOR TELEMETRY TRANSMISSION, DATA WILL BE TRANSMITTED WITH A 30-SEC TIME RESOLUTION. THE ELECTROMETER-AMPLIFIERS WILL BE ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTORS CANNOT BE CALIBRATED IN FLIGHT, BUT THE ELECTROMETER-AMPLIFIERS MAY BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

----- SOLRAD 110, KREPLIN -----

EXPERIMENT NAME- 44- TO 60-A SOLAR X-RAY MONITOR

NSSDC ID- SRD-110-06

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF TWO COMPLETE SETS OF IONIZATION-CHAMBER AND ELECTROMETER-AMPLIFIER COMBINATIONS. THE IONIZATION CHAMBERS WILL BE SENSITIVE TO SOLAR X RAYS IN THE 44- TO 60-A RANGE. THE TWO SETS WILL BE DRIVEN BY SEPARATE POWER SUPPLIES. ALTHOUGH ONLY ONE SET WILL BE SELECTED FOR TELEMETRY TRANSMISSION, DATA WILL BE TRANSMITTED WITH A 30-SEC TIME RESOLUTION. THE ELECTROMETER-AMPLIFIERS WILL BE ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE ELECTROMETER-AMPLIFIERS MAY BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR. THE DETECTORS CAN BE CALIBRATED IN FLIGHT BY COMMANDING A SHUTTER-MOUNTED RADIOACTIVE SOURCE INTO POSITION.

----- SOLRAD 110, KREPLIN -----

EXPERIMENT NAME- 170- TO 1050-A SOLAR EUV MONITOR

NSSDC ID- SRD-110-07

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE SETS OF LITHIUM FLUORIDE PHOTSENSITIVE SURFACE DETECTORS COUPLED TO FOUR-RANGE ELECTROMETER-AMPLIFIERS. THE THREE SETS WILL NOT BE REDUNDANT DUE TO THE DIFFERENT FILTERS BEING USED. A BERYLLIUM FILTER WILL LIMIT ONE DETECTOR'S RESPONSE TO THE RANGE FROM 170 TO 500 A. A TIN FILTER WILL LIMIT A SECOND DETECTOR'S RESPONSE TO THE RANGE FROM 450 TO 850 A. AN IODINE FILTER WILL LIMIT A THIRD DETECTOR'S RESPONSE TO THE RANGE FROM 725 TO 1050 A. THE DETECTOR-ELECTROMETER SETS WILL BE DRIVEN BY SEPARATE POWER SUPPLIES. EACH DETECTOR WILL BE READ EVERY 7.5 SEC. THE ELECTROMETERS MAY BE CALIBRATED DURING FLIGHT WITHOUT DETACHING THE DETECTOR, ALTHOUGH THE DETECTORS CANNOT BE

CALIBRATED IN FLIGHT.

----- SOLRAD 110, KREPLIN -----

EXPERIMENT NAME- 1000- TO 1350-A SOLAR UV MONITOR

NSSDC ID- SRD-110-00

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF ONE 4-RANGE ELECTROMETER-AMPLIFIER AND THREE IONIZATION CHAMBERS. TWO OF THE IONIZATION CHAMBERS WILL BE THE STANDARD GAS-FILLED CHAMBERS FLOWN ON PREVIOUS SOLRAD SATELLITES. THESE DETECTORS, ELECTRONICALLY AND MECHANICALLY PAIRED, WILL BE DESIGNATED DETECTOR 'A'. THE THIRD IONIZATION CHAMBER WILL BE AN EVACUATED CHAMBER WITH A LITHIUM FLUORIDE PHOTOSENSITIVE SURFACE, AND WILL BE DESIGNATED DETECTOR 'D'. NORMALLY, DETECTOR B WILL BE CONTINUOUSLY SELECTED FOR TELEMETRY TRANSMISSION AND WILL BE REPLACED ONLY OCCASIONALLY BY DETECTOR A FOR CALIBRATING EXPERIMENT 80 AND EXPERIMENT 90. A MECHANICAL SHUTTER, MONITORED BY COMMAND, WILL SHIELD THE WINDOW OF DETECTOR A FROM THE SUN. THE ELECTROMETER-AMPLIFIER CAN BE CALIBRATED WITHOUT DETACHING THE DETECTOR FROM THE SYSTEM. DATA WILL BE SAMPLED AT 15-SEC INTERVALS.

----- SOLRAD 110, KREPLIN -----

EXPERIMENT NAME- 0.5- TO 3-A SOLAR X-RAY MONITOR

NSSDC ID- SRD-110-12

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF THREE IONIZATION CHAMBERS CONNECTED IN PARALLEL TO A SINGLE ELECTROMETER-AMPLIFIER. THE IONIZATION CHAMBERS WILL BE SENSITIVE TO SOLAR X RAYS IN THE 0.5- TO 3.0-A RANGE. DATA WILL BE TRANSMITTED WITH A 15-SEC TIME RESOLUTION. THE ELECTROMETER-AMPLIFIER WILL BE ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTORS CANNOT BE CALIBRATED IN FLIGHT, BUT THE ELECTROMETER-AMPLIFIERS MAY BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

----- SOLRAD 110, KREPLIN -----

EXPERIMENT NAME- 1- TO 20-A SOLAR X-RAY MONITOR

NSSDC ID- SRD-110-13

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - R.G. TAYLORUS NAVAL RESEARCH LAB
WASHINGTON, DC

OI - D.M. MORANUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL CONSIST OF AN IONIZATION CHAMBER AND ONE ELECTROMETER-AMPLIFIER. THE IONIZATION CHAMBER WILL BE SENSITIVE TO SOLAR X RAYS IN THE 1- TO 20-A RANGE. DATA WILL BE TRANSMITTED WITH A 30-SEC TIME RESOLUTION. THE ELECTROMETER-AMPLIFIER WILL BE ABLE TO CHANGE CURRENT RANGES AUTOMATICALLY OR MANUALLY. THE DETECTOR CANNOT BE CALIBRATED IN FLIGHT, BUT THE ELECTROMETER-AMPLIFIER MAY BE CALIBRATED ON EACH RANGE WITHOUT DETACHING THE DETECTOR.

----- SOLRAD 110, WEEKINS -----

EXPERIMENT NAME- CONTINUUM (8.8 A) AND MAGNESIUM LINE
(9.17 A AND 8.42 A) MONITOR

NSSDC ID- SRD-110-03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.F. WEEKINSUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

SOLAR X RAYS WILL BE OBSERVED IN THE MAGNESIUM 11 AND 12 LINES (9.17 AND 8.42 A) AND IN THE CONTINUUM AT 8.8 A. THREE SHA CRYSTALS FIXED AT THREE DIFFERENT ANGLES WILL ALLOW SOLAR X RAYS TO UNDERGO FIRST-ORDER BRAGG REFLECTION INTO THREE PROPORTIONAL COUNTERS. SHOULD THE SPACECRAFT SPIN AXIS BECOME IMPROPERLY ORIENTED, THE SPECTROMETER WOULD FUNCTION PROPERLY. IF THE ASPECT ANGLE WERE NO MORE THAN ONE DEG OFF NOMINAL, ALTHOUGH THE INSTRUMENT WILL THEN FUNCTION AS A SCANNING SPECTROMETER WITH AN EXTREMELY SMALL SPECTRAL RANGE IN THE VICINITY OF THE TARGET WAVELENGTHS. DATA WILL BE ACCUMULATED OVER INCREMENTS OF 1/64 OF A SPACECRAFT SPIN PERIOD, AND THE EXPERIMENT WILL HAVE A SAMPLING CYCLE OF APPROXIMATELY 1-MIN DURATION.

----- SOLRAD 110, WEEKINS -----

EXPERIMENT NAME- BRAGG X-RAY POLARIMETER

NSSDC ID- SRD-110-11

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.F. WEEKINSUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL UTILIZE A LITHIUM FLUORIDE CRYSTAL FIXED AT AN ANGLE SO AS TO ALLOW SOLAR X-RAYS OF ABOUT 2.8 A TO UNDERGO FIRST-ORDER BRAGG REFLECTION INTO A PROPORTIONAL COUNTER. SINCE THE REFLECTION OF POLARIZED RADIATION DEPENDS UPON THE ANGLE BETWEEN THE ELECTRIC VECTOR OF THE RADIATION AND THE REFLECTING ANGLE OF THE CRYSTAL, THE SPIN OF THE SATELLITE WILL MODULATE THE INTENSITY OF REFLECTED POLARIZED RADIATION. DATA PULSES ASSOCIATED WITH 45-DEG SECTORS IN THE ROLL DIRECTION WILL BE ELECTRONICALLY GATED INTO CORRESPONDING ACCUMULATORS. SIGNAL VARIATIONS FROM SECTOR TO SECTOR WILL INDICATE THE PRESENCE OF POLARIZED RADIATION. DATA FOR EACH 45-DEG SECTOR WILL BE ACCUMULATED FOR AN INTEGRAL NUMBER OF SPINS AND READ OUT ONCE IN EACH 2-MIN TELEMETRY CYCLE.

----- SOLRAD 110, SMATHERS -----

EXPERIMENT NAME- X-RAY MONITOR (0.1-1.6 A, 0.5-3 A,
1-4 A)

NSSDC ID- SRD-110-02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.W. SMATHERSUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

FOUR GAS-FILLED PROPORTIONAL COUNTERS WILL BE USED TO MEASURE X-RAY EMISSION BETWEEN 4 AND 100 KEV IN FOUR CHANNELS. ALL FOUR DETECTORS WILL HAVE 10-MIL BERYLLIUM WINDOWS, PLUS ADDITIONAL ALUMINUM OR BERYLLIUM MOUNTED IN FRONT OF THE DETECTORS. EACH DETECTOR WILL BE SAMPLED ONCE EVERY 7-5 SEC. ALTHOUGH AN OPTIONAL MODE WILL TRANSMIT DATA FROM ONLY ONE OR TWO DETECTORS, EFFECTIVELY QUADRUPLE OR DOUBLING THE SAMPLING RATE OF THAT DETECTOR. IN-FLIGHT CALIBRATION WILL BE PERFORMED BY USING A RADIOACTIVE SOURCE WHICH CAN BE MOVED IN FRONT OF THE DETECTORS UPON COMMAND.

----- SOLRAD 110, VAMPOLA -----

EXPERIMENT NAME- SOLAR FLARE ELECTRONS

NSSDC ID- SRD-110-22

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.L. VAMPOLAAEROSPACE CORP
EL SEGUNDO, CA

OI - J.D. BLAKEAEROSPACE CORP
EL SEGUNDO, CA

OI - R.W. KREPLINUS NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE SOLAR ELECTRONS. TWO PERMANENT MAGNETS WILL BE USED TO MOMENTUM-ANALYZE INCIDENT ELECTRONS. ARRAYS OF SILICON DETECTORS WILL COUNT INCIDENT ELECTRONS IN 12 ENERGY CHANNELS FROM 11 KEV TO 1.5 MEV. SPIN-INTEGRATED DATA WILL BE OBTAINED ONCE EVERY 2 MIN, EXCEPT THAT 11-KEV AND 405-KEV DATA WILL BE STORED INTO QUADRANTS, AND 60-KEV AND 610-KEV DATA WILL BE OBTAINED WITH 15-SEC RESOLUTION.

----- SOLRAD 110, WELLER, JR. -----

EXPERIMENT NAME- GEOCORONAL-EXTRATERRESTRIAL EUV -
DETECTOR 1

NSSDC ID- SRD-110-18

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.S. KELLER, JR.US NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION
A COLLIMATED CHANNELTRON PHOTOMULTIPLIER MOUNTED BEHIND
A FILTER WHEEL WILL BE USED TO MEASURE EUV RADIATION FROM
NON-SOLAR SOURCES. THE FILTER WHEEL WILL ENABLE INVESTIGATORS
TO ISOLATE VARIOUS EMISSION LINES BETWEEN 200 AND 1400 Å AND
ALLOW IN-FLIGHT CALIBRATION THROUGH THE USE OF A RADIOACTIVE
SOURCE. THE DETECTOR WILL BE MOUNTED TO LOOK 90 DEG OFF THE
SPIN AXIS OF THE SPACECRAFT AND WILL SWEEP THE CELESTIAL
SPHERE IN ABOUT 6 MONTHS. EACH DATA SAMPLE WILL BE ACCUMULATED
OVER INCREMENTS OF 1/64 OF THE SPACECRAFT'S SPIN. WITH THE
SAMPLE SOURCE REFERENCED TO EITHER A STAR PULSE OR THE EARTH
PULSE. THE DATA WILL BE READ OUT IN 2-MIN INTERVALS. THIS
EXPERIMENT IS NOT EXPECTED TO BE OPERATED MORE THAN 1 HR PER
DAY.

----- SOLRAD 110, KELLER, JR. -----

EXPERIMENT NAME- GEODRONAL-EXTRATERRESTRIAL EUV -
DETECTOR 2

NSSDC ID- SRD-110-19

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.S. KELLER, JR.US NAVAL RESEARCH LAB
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION
A COLLIMATED CHANNELTRON PHOTOMULTIPLIER MOUNTED BEHIND
A FILTER WHEEL WILL BE USED TO MEASURE EUV RADIATION FROM
NON-SOLAR SOURCES. THE FILTER WHEEL WILL ENABLE INVESTIGATORS
TO ISOLATE VARIOUS EMISSION LINES BETWEEN 200 AND 1400 Å AND
ALLOW IN-FLIGHT CALIBRATION THROUGH THE USE OF A RADIOACTIVE
SOURCE. THE DETECTOR WILL BE MOUNTED TO LOOK 90 DEG OFF THE
SPIN AXIS OF THE SPACECRAFT AND WILL SWEEP THE CELESTIAL
SPHERE IN ABOUT 6 MONTHS. EACH DATA SAMPLE WILL BE ACCUMULATED
OVER INCREMENTS OF 1/64 OF THE SPACECRAFT'S SPIN. WITH THE
SAMPLE SOURCE REFERENCED TO EITHER A STAR PULSE OR THE EARTH
PULSE. THE DATA WILL BE READ OUT IN 2-MIN INTERVALS. THIS
EXPERIMENT IS NOT EXPECTED TO BE OPERATED MORE THAN 1 HR PER
DAY.

***** SPACE SHUTTLE *****

SPACECRAFT COMMON NAME- SPACE SHUTTLE
ALTERNATE NAMES-
NSSDC ID- SHUTTLE

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 12/00/78 SPACECRAFT WEIGHT- KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE-

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-QMSP

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN INCLINATION- DEG
PERIAPSIS- KM ALT APOAPSIS- KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - H.S. WALKINNASA HEADQUARTERS
WASHINGTON, DC
PM - R. THOMPSONNASA-JSC
HOUSTON, TX

SPACECRAFT BRIEF DESCRIPTION
THE SPACE SHUTTLE PROJECT WILL CONSIST OF A SERIES OF
REUSABLE SPACE TRANSPORTATION SYSTEMS THAT WILL BE USED IN
THREE DIFFERENT WAYS -- (1) TO CARRY AUTOMATED SATELLITES TO
NEAR-EARTH ORBIT FROM WHICH THEY MAY BE LAUNCHED TO HIGHER
ALTITUDES WITH ADDITIONAL BOOSTER STAGES, (2) TO LAUNCH MAJOR
AUTOMATED SATELLITES INTO NEAR-EARTH ORBIT AND TO PROVIDE
REVISIT AND MAINTENANCE OPPORTUNITIES, AND (3) TO CARRY
SCIENTIFIC EQUIPMENT INTO ORBIT AND RETURN TO EARTH AFTER
PERIODS OF 7 TO 30 DAYS (SORTIE MISSIONS). THE "FINAL REPORT
OF THE SPACE SHUTTLE PAYLOAD PLANNING WORKING GROUPS"
(NASA-GSFC, MAY 1973) PROPOSES THAT EXPERIMENTS BE CARRIED OUT
IN THE FOLLOWING MAJOR FIELDS -- (1) ASTRONOMY, USING A LARGE
SPACE TELESCOPE (LST) AND SEVERAL OTHER IR AND UV TELESCOPES,
(2) ATMOSPHERIC AND SPACE PHYSICS, USING TRACER RELEASE
TECHNIQUES, (3) HIGH-ENERGY ASTROPHYSICS (X-RAY ASTRONOMY,
STRUCTURE AND DYNAMICS OF THE INTERSTELLAR MEDIUM), USING
VARIOUS TELESCOPES, SPECTROMETERS, PROPORTIONAL COUNTER
ARRAYS, AND PROBES, (4) LIFE SCIENCES, AN AGGREGATE OF RELATED
RESEARCH AND TECHNOLOGY EFFORTS INCLUDING PLANETARY BIOLOGY,
DIODEMIDICINE, BIOLOGY, AND ADVANCED TECHNOLOGY, (5) SOLAR
PHYSICS, USING VARIOUS POLARIMETERS, SCINTILLATORS,
PROPORTIONAL COUNTERS, SPARK CHAMBERS, AND NEUTRON DETECTORS,
(6) COMMUNICATIONS AND NAVIGATION, (7) EARTH OBSERVATIONS,
INCLUDING MONITORING OVER LONG PERIODS OF TIME OF THE PHYSICAL
STATE AND DYNAMIC BEHAVIOR OF THE EARTH'S LAND SURFACE
FEATURES AS WELL AS THE OTHER ELEMENTS OF GLOBAL ENVIRONMENT
(AIR, WATER, AND ICE), (8) EARTH AND OCEAN PHYSICS, (9)

MATERIALS PROCESSING AND SPACE MANUFACTURING, AND (10) SPACE
TECHNOLOGY. APPROXIMATELY 440 LAUNCHES HAVE BEEN PROPOSED, TO
COVER A PERIOD OF 12 YEARS.

***** SPACELAB *****

SPACECRAFT COMMON NAME- SPACELAB
ALTERNATE NAMES-
NSSDC ID- SPACLAB

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 11/00/80 SPACECRAFT WEIGHT- 14500. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- SHUTTLE

SPONSORING COUNTRY/AGENCY
INTERNATIONAL ESRO
UNITED STATES NASA-QMSP

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN INCLINATION- DEG
PERIAPSIS- KM ALT APOAPSIS- KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - H. STOEVENESRO-ESTEC
NOORDWIJK, NETHERLANDS

SPACECRAFT BRIEF DESCRIPTION
SPACELAB WILL CONSIST OF HUMANABLE PRESSURIZED LABORATORY
MODULES AND UNPRESSURIZED INSTRUMENT PLATFORMS (PALLETS)
SUITABLE FOR CONDUCTING RESEARCH AND APPLICATION ACTIVITIES ON
SPACE SHUTTLE (NASA) SORTIE MISSIONS. THE MODULE AND THE
PALLET, EITHER SEPARATELY OR TOGETHER, WILL BE TRANSPORTED TO
AND FROM EARTH ORBIT IN THE SPACE SHUTTLE ORBITER PAYLOAD BAY
AND WILL REMAIN ATTACHED TO, AND SUPPORTED BY, THE ORBITER
THROUGHOUT EACH MISSION. SPACELAB WILL BE DESIGNED FOR AN
OPERATIONAL LIFETIME OF 30 MISSIONS, EACH OF 7 DAYS DURATION
AFTER GROUND REFURNISHMENT. NON-ASTRONAUT SCIENTISTS AND
ENGINEERS (AVERAGE CREW SIZE WILL BE FOUR SCIENTISTS IN
ADDITION TO THE TWO CREWMEN OPERATING THE SPACE SHUTTLE) WILL
BE ON THE FLIGHT TO CONTROL EXPERIMENTS AND SUBSYSTEMS AND
BRING BACK THEIR DATA. THE SPACELAB CREW WILL RIDE IN THE
ORBITER DURING ASCENT AND DESCENT AND WILL USE THESE
FACILITIES FOR EATING, SLEEPING, AND PERSONAL HYGIENE.
SPACELAB WILL BE THE WORKING BASE, AND THE USE (FOR THE FIRST
TIME IN SPACE WORK) OF A SEA-LEVEL OXYGEN/NITROGEN ATMOSPHERE
WILL MEAN THAT THE SPACELAB CREW WILL HAVE AN EARTH-TYPE
ENVIRONMENT (EXCEPT FOR ZERO-G) IN THEIR LABORATORY. SEE
ESRO/ELDO BULLETIN, AUGUST 1973, FOR FURTHER INFORMATION.

***** SRATS *****

SPACECRAFT COMMON NAME- SRATS
ALTERNATE NAMES-
NSSDC ID- SRATS

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 1975 SPACECRAFT WEIGHT- 70. KG
LAUNCH SITE- KAGOSHIMA, JAPAN
LAUNCH VEHICLE- M-3S-C

SPONSORING COUNTRY/AGENCY
JAPAN TOKYO U

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- MIN INCLINATION- 30. DEG
PERIAPSIS- 250. KM ALT APOAPSIS- 2000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - K. HIRAOU OF TOKYO
TOKYO, JAPAN

SPACECRAFT BRIEF DESCRIPTION
SRATS (SOLAR RADIATION AND THERMOSPHERIC SATELLITE) WILL
BE AN AERONOMY RESEARCH SATELLITE. IT WILL HAVE AN OCTAGONAL
COLUMN FORM (75 CM IN DIAM AND 65 CM IN HEIGHT), IN WHICH THE
EXPERIMENT INSTRUMENTS WILL BE MOUNTED. THE SATELLITE WILL BE
SPIN STABILIZED IN A ROLLING WHEEL MODE BY A GEOMAGNETIC
ATTITUDE CONTROL SYSTEM. FOUR PLASMA PROBES CAN BE EXTENDED
PERPENDICULAR TO THE SPIN AXIS BY 0.5-M METALLIC BOOMS. POWER
AT AN AVERAGE RATE OF 15 W WILL BE PROVIDED BY 6000 SILICON
N-P SOLAR CELLS. THE OBJECTIVES OF THE SATELLITE WILL BE TO
STUDY THE IONOSPHERE SYSTEMATICALLY BY SIMULTANEOUSLY
OBSERVING SOLAR IONIZING RADIATIONS (HYDROGEN LYMAN-ALPHA AND
X RAYS), THE ULTRAVIOLET ALBEDO OF THE EARTH, POSITIVE ION
COMPOSITION, AND PLASMA PARAMETERS SUCH AS ELECTRON AND ION
DENSITIES AND TEMPERATURES IN THE IONOSPHERE.

----- SRATS, FUGONO -----

EXPERIMENT NAME- IONIC COMPOSITION

NSSDC ID- SRATS -07

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - N. FUGONORADIO RESEARCH LAB
TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION

THE PRIMARY OBJECTIVE OF THIS ION COMPOSITION EXPERIMENT WILL BE TO MEASURE THE CONCENTRATIONS OF DIFFERENT ION SPECIES AND THEIR HEIGHT DISTRIBUTIONS AS A FUNCTION OF LOCATION, TIME, AND SOLAR AND GEOMAGNETIC ACTIVITY. A BENNETT-TYPE ION MASS SPECTROMETER WITH AN ELECTRON MULTIPLIER WILL BE USED. THIS SENSOR, MOUNTED WITH ITS AXIS PERPENDICULAR TO THE SPACECRAFT'S SPIN AXIS, WILL MEASURE IN SEQUENCE THE CONCENTRATIONS OF ATOMIC HYDROGEN, HELIUM, AND OXYGEN IONS. THE OUTPUT CURRENT WILL BE AMPLIFIED AS AN ANALOG SIGNAL AND RECORDED AND TELEMETRED AS A DIGITAL SIGNAL. THE MAXIMUM SENSITIVITY WILL BE ON THE ORDER OF 10 IONS PER CUBIC CENTIMETER.

----- SRATS, HIRAO -----

EXPERIMENT NAME- ELECTRON TEMPERATURE

NSSDC ID- SRATS -05

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - K. HIRAOU OF TOKYO
TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
ELECTRON TEMPERATURE WILL BE DIRECTLY MEASURED WITH AN IMPROVED TYPE OF ELECTRON TEMPERATURE PROBE FOR STRUCTURAL STUDY OF THE IONOSPHERE.

----- SRATS, MATSUOKA -----

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NSSDC ID- SRATS -01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - H. MATSUOKAU OF TOKYO
TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
CONTINUOUS MEASUREMENT OF THE TOTAL DISC INTENSITY OF SOLAR X RAYS WILL BE MADE WITH PROPORTIONAL COUNTERS.

----- SRATS, MIYAZAKI -----

EXPERIMENT NAME- PLASMA DIAGNOSIS

NSSDC ID- SRATS -06

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S. MIYAZAKIRADIO RESEARCH LAB
TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
A RETARDING POTENTIAL TRAP WILL BE USED FOR A MULTI-PURPOSE EXPERIMENT ON PLASMA DENSITY, TEMPERATURE, AND ION COMPOSITION OF THE THERMOSPHERIC PLASMA. LANGMUIR CURVES WILL BE TRANSMITTED THROUGH A 128-CHANNEL MAGNETIC-CORE MEMORY ANALYZER.

----- SRATS, OHYA -----

EXPERIMENT NAME- ELECTRON DENSITY MEASUREMENT

NSSDC ID- SRATS -04

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - H. OHYAKYOTO U
KYOTO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
CONTINUOUS MEASUREMENT OF LOCAL ELECTRON DENSITY WILL BE MADE BY MEANS OF AN IMPEDANCE PROBE.

----- SRATS, OSHIO -----

EXPERIMENT NAME- HYDROGEN LYMAN-ALPHA

NSSDC ID- SRATS -02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - T. OSHIOOSAKA CITY U
OSAKA, JAPAN

EXPERIMENT BRIEF DESCRIPTION
CONTINUOUS MEASUREMENT OF HYDROGEN LYMAN-ALPHA EMISSION WILL BE MADE WITH A LIFE-NO IONIZATION CHAMBER.

----- SRATS, TOMIYASU -----

EXPERIMENT NAME- GEOCORONAL UV GLOW AND EARTH UV ALBEDO

NSSDC ID- SRATS -03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - T. TOMIYASUU OF TOKYO
TOKYO, JAPAN

EXPERIMENT BRIEF DESCRIPTION
OBSERVATIONS OF HYDROGEN, HELIUM, AND ATOMIC OXYGEN LINES WILL BE MADE WITH TWO IONIZATION CHAMBERS AND FOUR METALLIC THIN-FILM CHANNELTRON PHOTON COUNTERS. TWO FILTER PHOTOMETERS WILL MONITOR THE OZONE CONTENT IN THE MESOSPHERE AND UPPER STRATOSPHERE THROUGH MEASUREMENTS OF THE INTENSITY OF ULTRAVIOLET ALBEDOS AT 2500 Å AND 2900 Å AND THEIR ANGULAR DISTRIBUTIONS.

----- TD 1A -----

SPACECRAFT COMMON NAME- TD 1A

ALTERNATE NAMES- PL-721E, TD 1
05879

NSSDC ID- 72-014A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/14/73.

LAUNCH DATE- 03/12/72 SPACECRAFT WEIGHT- 472. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- TA DELTA

SPONSORING COUNTRY/AGENCY
INTERNATIONAL ESRO

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 03/12/72
ORBIT PERIOD- 95.291 MIN INCLINATION- 97.555 DEG
PERIAPSIS- 523.43 KM ALT APOAPSIS- 541.9 KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 12/28/73
ORBIT PERIOD- 95.177 MIN INCLINATION- 97.567 DEG
PERIAPSIS- 525. KM ALT APOAPSIS- 532. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - T.I. CURLESRO-ESTEC
NOORDWIJK, NETHERLANDS
PM - R.J. GROSSNASA-GSFC
GREENBELT, MD
PS - J. VON VOCHTELESRO-ESTEC
NOORDWIJK, NETHERLANDS

SPACECRAFT BRIEF DESCRIPTION
THE TD-1 SPACECRAFT WAS ESSENTIALLY COMPOSED OF TWO BOXES. THE UPPER BOX CONTAINED THE EXPERIMENTS AND THE LOWER BOX CONTAINED THE SPACECRAFT EQUIPMENT. THE EXPERIMENT COMPARTMENT WAS BUILT AROUND TWO LARGE TELESCOPES (26 AND 30 CM IN DIAM) AND A SPARK CHAMBER. THE SPACECRAFT WAS SOLAR POWERED, AND DURING THE SUNLIT PHASE OF ITS ORBIT WAS ATTITUDE CONTROLLED TO ABOUT 1 MIN OF ARC. ONE AXIS WAS POINTED TO WITHIN ONE ARC-MIN OF THE SUN, AND ANOTHER AXIS LAY WITHIN 0.5 DEG OF THE PLANE OF THE SUN, EARTH, AND SPACECRAFT (1.e., THE SPACECRAFT Z AXIS ALWAYS POINTED TOWARDS THE EARTH). BOTH TAPE RECORDERS FAILED WITHIN TWO MONTHS OF LAUNCH, CAUSING DATA RECOVERY TO DROP FROM 95 PERCENT TO LESS THAN 25 PERCENT. IN OCTOBER 1972, THE SPACECRAFT WAS PLACED IN HIBERNATION FOR ABOUT FOUR MONTHS SINCE IT COULD NOT WITHSTAND, FOR ANY LENGTH, PERIODS OF SPACECRAFT NIGHT WHILE IN ACTIVE USE. IN FEBRUARY 1973 THE SPACECRAFT WAS SUCCESSFULLY REACTIVATED AND REAL-TIME TELEMETRY COVERAGE WAS INCREASED TO ABOUT 70 PERCENT. THE COSMIC X-RAY SPECTROMETER EXPERIMENT (S-77) CAUSED ABNORMAL READOUTS IN THE HOUSEKEEPING TELEMETRY CHANNELS, AND HENCE WAS NOT OPERATED UNTIL JULY, 1973.

----- TD 1A, DE JAGER -----

EXPERIMENT NAME- SOLAR X-RAY MONITOR

NSSDC ID- 72-014A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/14/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C. DE JAGERU OF UTRECHT
UTRECHT, NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT OBSERVED HARD X RAYS EMITTED BY THE SUN, DIVIDING PULSES OBTAINED FROM A CESIUM IODIDE (CSI) CRYSTAL INTO 12 LOGARITHMICALLY EQUISPACED ENERGY INTERVALS BETWEEN 24 AND 900 KEV. THE EXPERIMENT TOOK ADVANTAGE OF THE CONTINUOUS SUN POINTING. A TIME RESOLUTION OF 1.2 SEC WAS ACHIEVED FOR THE FOUR CHANNELS BETWEEN 24 AND 90 KEV. THE RESOLUTION WAS 4.8 SEC FOR THE OTHER CHANNELS.

----- TO 1A, KAMPERMAN -----
EXPERIMENT NAME- UV STELLAR SPECTROMETER
NSSDC ID- 72-014A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/14/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - 1. KAMPERMANSPACE RESEARCH LAB
UTRECHT, NETHERLANDS

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF A CASSEGRAIN TELESCOPE
(PRIMARY MIRROR 26 CM IN DIAM) AND A GRATING SPECTROMETER
WHICH OPERATED IN THREE PASSBANDS (2260 TO 2155 Å, 2495 TO
2590 Å, AND 2775 TO 2865 Å). WHEN A STAR OF SUFFICIENT
BRIGHTNESS APPEARED IN THE TELESCOPE, THE TELESCOPE LOCKED
ONTO IT WITH A SELF-CONTAINED GUIDANCE SYSTEM AND THEN SCANNED
THREE 100-Å PASSBANDS IN 0.5 Å INCREMENTS WITH AN OVERALL
ACCURACY OF 1 Å AND SPECTRAL RESOLUTION OF 1.8 Å.

----- TO 1A, LABEYRIE -----
EXPERIMENT NAME- SPECTROMETRY OF PRIMARY CHARGED
PARTICLES

NSSDC ID- 72-014A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/14/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J. LABEYRIECENS
SACLAY, FRANCE

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT MEASURED THE CHARGE SPECTRUM OF PRIMARY
COSMIC RAYS BY USING A CHARGED PARTICLE TELESCOPE AND
COINCIDENCE TECHNIQUES. THE TELESCOPE WAS MOUNTED ALONG THE
MAIN AXIS OF THE SATELLITE, WHICH WAS ALWAYS POINTED TOWARD
THE CENTER OF THE SUN.

----- TO 1A, LABEYRIE -----
EXPERIMENT NAME- SPECTROMETRY OF EXTRATERRESTRIAL X RAYS

NSSDC ID- 72-014A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 07/02/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J. LABEYRIECENS
SACLAY, FRANCE

EXPERIMENT BRIEF DESCRIPTION
A 100-50-CM PROPORTIONAL COUNTER WAS USED TO MEASURE THE
SPECTRA OF COSMIC X-RAY SOURCES IN 10 CHANNELS BETWEEN 3 AND
30 KEV. THE PROPORTIONAL COUNTER WAS LOCATED BEHIND A CROSSED
PAIR OF SLOT COLLIMATORS WHICH TOGETHER YIELDED A 5- BY 1-DEG
FIELD OF VIEW. THE PROPORTIONAL COUNTER HAD A 0.5-MM BERYLLIUM
WINDOW AND A XENON FILLER GAS. IT WAS CONSTRUCTED IN TWO
PARTS, WHICH WERE THEN ANTICOINCIDENCED TO REMOVE THE
BACKGROUND DUE TO COSMIC-RAY PARTICLES. DUE TO OPERATIONAL
DIFFICULTIES, THIS EXPERIMENT WAS TURNED OFF SOON AFTER IT WAS
TURNED ON, AND WAS NOT TURNED ON AGAIN UNTIL JULY 2, 1973.

----- TO 1A, LABEYRIE -----
EXPERIMENT NAME- GAMMA-RAY MEASUREMENT

NSSDC ID- 72-014A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/14/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - J. LABEYRIECENS
SACLAY, FRANCE

EXPERIMENT BRIEF DESCRIPTION
AN OPTICAL SPARK CHAMBER WITH COUNTERS AND A VIDICON
SYSTEM WAS USED TO MEASURE GAMMA RAYS IN THE 70- TO 300-KEV
ENERGY RANGE. THE SENSITIVE AREA OF THE DETECTOR WAS 200 SQ
CM, AND THE EFFICIENCY FOR GAMMA RAYS WAS 10 PERCENT. ALL OF
THE SKY WAS SCANNED IN 6 MONTHS WITH A SENSITIVITY CAPABLE OF
DETECTING A FLUX OF GREATER THAN 1E-5 PHOTONS/SQ CM-SEC.

----- TO 1A, MONFILS -----
EXPERIMENT NAME- STELLAR UV RADIATION EXPERIMENT

NSSDC ID- 72-014A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/14/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - A.G. MONFILSU OF LIEGE
LIEGE, BELGIUM
OI - C. JANARU OF LIEGE
LIEGE, BELGIUM

OI - P.J. BARKERRUTHERFORD LAB
CHILTON, DIDCOT, BERKSHIRE, ENGLAND
OI - R. WILSONU COLLEGE LONDON
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A 1.4-M TELESCOPE WITH A
SPECTROMETER BOX ATTACHED TO IT. AN OFF-AXIS PARADOLOID MIRROR
(F/3.5, DIAM 275 MM) REFLECTED STARLIGHT ONTO A SYSTEM OF TWO
SLITS SITUATED IN THE PRIME FOCAL PLANE. ONE OF THE TWO SLITS
FEED THE STELLAR LIGHT INTO A SINGLE PHOTOMETRIC CHANNEL WITH A
FILTER LIMITING THE PASSBAND TO 400 Å CENTERED AT 2750 Å. THE
OTHER SLIT WAS MUCH WIDER (11.9 X 17 ARC-MIN), AND LED INTO
THE THREE-CHANNEL GRATING SPECTROMETER. ONCE PER ORBIT, THE
TELESCOPE, ALIGNED ALONG THE Z AXIS, SCANNED A GREAT CIRCLE OF
THE SKY. BECAUSE OF THIS MOTION ACROSS THE SKY, THE PRIMARY
IMAGE OF A CERTAIN STAR ENTERING THE TELESCOPE'S FIELD OF VIEW
MOVED ACROSS THE PHOTOMETER AND SPECTROPHOTOMETER SLOTS. WHILE
THE STAR IMAGE TRAVERSED THE WIDE SPECTROPHOTOMETER SLOT, ITS
CORRESPONDING SPECTRUM MOVED IN THE FOCAL PLANE OF THE
SPECTROGRAPH ACROSS THE THREE EXIT SLITS, BEHIND WHICH THERE
WERE THREE PULSE-COUNTING PHOTOMULTIPLIERS. BY EMPLOYING THE
SCANNING MOTION OF THE SATELLITE, A SPECTRUM SCANNING ACTION
WAS ACHIEVED WITHOUT THE NEED FOR MOVING PARTS. THE THREE EXIT
SLITS OF THE SPECTROPHOTOMETER WERE FIXED AT THE FOLLOWING
WAVELENGTHS -- 1350 TO 1760 Å, 1760 TO 2160 Å AND 2150 TO 2550
Å. THE WAVELENGTH REGION FROM 1350 TO 2550 Å WAS FULLY COVERED
BY THE THREE CHANNELS IN 3.3 SEC, YIELDING A TOTAL OF ABOUT 60
DATA POINTS. IN EACH CHANNEL THE SPECTRUM WAS SCANNED AT
19.4-Å INTERVALS. THE EFFECTIVE PASSBAND DURING EACH
INTEGRATION INTERVAL HAVING A FULL-WIDTH HALF-MAXIMUM OF 35 TO
40 Å. JUST BEFORE THE TELESCOPE WAS INTEGRATED INTO THE
SATELLITE, THE INSTRUMENT WAS EXTENSIVELY CALIBRATED IN ORDER
TO ACHIEVE AN ABSOLUTE PHOTOMETRIC ACCURACY BETWEEN 10 AND 20
PERCENT, A RELATIVE PHOTOMETRIC ACCURACY WITHIN 10 PERCENT AND
A WAVELENGTH CALIBRATION ACCURATE TO A FEW ANGSTROMS. THIS
EXPERIMENT WAS TO DETECT 20,000 STARS, OF WHICH 6000 SHOULD
HAVE GIVEN USEFUL UV SPECTRA. IT WAS ABLE TO MEASURE STARS OF
MAGNITUDE 10.5. TWO MAJOR OBJECTIVES WERE THE STUDY OF
INTERSTELLAR EXTINCTION AND THE PREPARATION OF A UV STAR
CATALOG.

----- TO 1A, OCCIALINI -----
EXPERIMENT NAME- SOLAR GAMMA RAYS IN THE 50- TO 500-KEV
ENERGY RANGE

NSSDC ID- 72-014A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 02/14/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - G. OCCIALINIU OF MILAN
MILAN, ITALY

EXPERIMENT BRIEF DESCRIPTION

A COMBINATION OF SCINTILLATORS AND PHOTOMULTIPLIERS WERE
USED TO DETECT SOLAR GAMMA RAYS (PHOTON ENERGY <LT. 50 AND
>GT. 500 MEV) WHILE DISCRIMINATING AGAINST CHARGED PARTICLES.
A DIRECTIONAL ACCURACY OF A FEW DEG WAS ACHIEVED. THE
EFFECTIVE AREA OF 100 SQ CM ALLOWED A BACKGROUND OF 1E-5
PHOTONS/SQ CM-SEC TO BE OBTAINED WHILE THE DYNAMIC RANGE
ALLOWED FLUXES UP TO 1E-2 TO BE MEASURED DURING SOLAR FLARES.

***** TIROS-N *****

SPACECRAFT COMMON NAME- TIROS-N
ALTERNATE NAMES-
NSSDC ID- TIROS-N

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 3 QTR 77 SPACECRAFT WEIGHT- 633. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- DELTA

SPONSORING COUNTRY/AGENCY NOAA-NESS
UNITED STATES

PLANNED ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC
ORBIT PERIOD- 120. MIN INCLINATION- 103. DEG
PERIAPSIS- 1678.00 KM ALT APOAPSIS- 1678.00 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - R.A. WEILANDNASA-GSFC
GREENBELT, MD
PS - W. SHENKNASA-GSFC
GREENBELT, MD
PS - A. ARKINGNASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

TIROS-N WILL BE THE PROTOTYPE FOR THE THIRD-GENERATION
SPACECRAFT IN THE NATIONAL OPERATIONAL METEOROLOGICAL
SATELLITE SYSTEM (NOMSS). THE SATELLITE WILL BE DESIGNED TO
SERVE AS AN ECONOMICAL AND STABLE SUN-SYNCHRONOUS PLATFORM FOR
TESTING ADVANCED OPERATIONAL SUBSYSTEMS FOR USE IN WEATHER
ANALYSIS AND FORECASTING. PRIMARY SPNSORS WILL INCLUDE AN
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) FOR OBSERVING
DAYTIME AND NIGHTTIME GLOBAL CLOUDCOVER AND A TIROS
OPERATIONAL VERTICAL SOUNDER (TOVS) FOR OBTAINING TEMPERATURE
AND WATER VAPOR PROFILES THROUGHOUT THE EARTH'S ATMOSPHERE.
SECONDARY EXPERIMENTS WILL BE A SPACE ENVIRONMENT MONITOR
(SEMI), WHICH WILL MEASURE THE PROTON AND ELECTRON FLUX NEAR

THE EARTH, AND A DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS), WHICH WILL PROCESS AND RELAY TO CENTRAL DATA ACQUISITION STATIONS VARIOUS METEOROLOGICAL DATA RECEIVED FROM FREE-FLOATING BALLOONS AND OCEAN BUOYS DISTRIBUTED AROUND THE GLOBE. THE SATELLITE WILL BE ABLE TO MAINTAIN AN EARTH-POINTING ACCURACY OF BETTER THAN PLUS OR MINUS 1 DEG IN ALL THREE AXES, WITH MOTION RATES OF LESS THAN 0.036 DEG/SEC.

----- TIROS-N, NESS STAFF -----

EXPERIMENT NAME- ADVANCED VERY HIGH RESOLUTION
RADIOMETER (AVHRR)

NSSDC ID- TIROS-N-01

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFF NOAA-NESS
SUITLAND, MD

EXPERIMENT BRIEF DESCRIPTION

THE TIROS-N ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR) WILL BE CAPABLE OF PROVIDING GLOBAL DAYTIME AND NIGHTTIME EARTH CLOUDCOVER PICTURES ON A REGULAR DAILY BASIS FOR USE IN WEATHER ANALYSIS AND FORECASTING. THE MULTISPECTRAL SCANNING INSTRUMENT WILL OPERATE IN BOTH REAL-TIME AND TAPE RECORDER MODES. THE FOUR-CHANNEL UNIT WILL USE THE FOLLOWING SPECTRAL WAVELENGTHS--CHANNEL 1, 0.4 TO 1.0 MICRON (VISIBLE), CHANNEL 2, 0.75 TO 1.00 MICRON (NEAR IR), CHANNEL 3, 10.5 TO 12.5 MICRONS (IR WINDOW) AND CHANNEL 4, 0.5 TO 7.0 MICRONS (WATER VAPOR). THE VISIBLE, NEAR IR, AND IR WINDOW CHANNELS HAVE A PLANNED GROUND RESOLUTION OF 1 KM. THE RESOLUTION OF THE WATER VAPOR CHANNEL WILL BE SOMEWHAT LESS, ABOUT 4 KM AT NADIR. EACH CHANNEL WILL HAVE ITS OWN ELECTRONICS PACKAGE CONSISTING OF AN AMPLIFIER, AN ANALOG-TO-DIGITAL CONVERTER, AND OTHER AUXILIARY ELECTRONICS. IDENTICAL EXPERIMENTS WILL BE FLOWN ON TIROS-M, -I, AND -J.

----- TIROS-N, NESS STAFF -----

EXPERIMENT NAME- TIROS OPERATIONAL VERTICAL SOUNDER
(TOVS)

NSSDC ID- TIROS-N-02

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - NESS STAFF NOAA-NESS
SUITLAND, MD
OI - UNKNOWN METEOROLOGICAL OFFICE
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THE TIROS OPERATIONAL VERTICAL SOUNDER (TOVS) TO BE FLOWN ON TIROS-N IS DESIGNED TO INDIRECTLY DETERMINE THE VERTICAL DISTRIBUTION OF TEMPERATURE, WATER VAPOR, AND OZONE BY MEASURING THE INFRARED RADIATION EMITTED FROM THE EARTH AND ITS ATMOSPHERE. THE TOVS TENTATIVELY WILL CONSIST OF TWO OPTICAL UNITS INTEGRATED INTO A SINGLE SOUNDING SYSTEM. UNIT 1 WILL HAVE 14 CHANNELS AND WILL VIEW THE FOLLOWING SPECTRAL INTERVALS -- CHANNEL 1 - THE 3.8-MICRON WINDOW REGION, CHANNEL 2 - THE 9.6-MICRON OZONE BAND, CHANNEL 3 - THE 11.1-MICRON WINDOW REGION, EIGHT CHANNELS IN THE 15-MICRON CARBON DIOXIDE BAND, AND THREE CHANNELS IN THE 10- TO 30-MICRON ROTATIONAL WATER VAPOR BAND. THE SECOND UNIT WILL HAVE THREE CHANNELS OPERATING AT 14.97 MICRONS, USING SELECTIVE ABSORPTION BY PASSING THE INCOMING RADIATION THROUGH THREE DOUBLE CELLS CONTAINING GASEOUS CARBON DIOXIDE AT DIFFERENT PRESSURES. THE SOUNDER WILL USE A STEP-SCAN DEVICE TO PROVIDE PLUS OR MINUS 40 DEG OF TRAVERSE SCAN, WHILE THE SPACECRAFT'S ORBITAL MOTION WILL PROVIDE SCANNING IN THE ORTHOGONAL DIRECTION. THE DESIGN WILL ALLOW SOUNDINGS TO BE TAKEN AS CLOSE AS 400 KM APART, AS COMPARED TO THE 900-KM SEPARATION THAT IS PRESENTLY NEEDED WITH THE SIRS-B EXPERIMENT ON NIMBUS-A. VERTICAL PROFILES OF TEMPERATURE, OZONE, AND WATER VAPOR CAN BE OBTAINED FROM THE REDUCED RADIANCE MEASUREMENTS BY MATHEMATICAL INVERSION TECHNIQUES. THE RESULTING TEMPERATURE PROFILE WILL GO FROM THE SURFACE TO 1 MB AND WILL HAVE AN ACCURACY OF PLUS OR MINUS 1 DEG K. THE WATER VAPOR PROFILE WILL EXTEND FROM THE SURFACE TO THE TROPOPAUSE AND WILL BE ACCURATE TO 20 PERCENT, WHILE THE OZONE WILL BE MEASURED TO WITHIN PLUS OR MINUS 0.01 CM. THE TOVS MAY EVENTUALLY INCLUDE TWO ADDITIONAL INSTRUMENTS - ONE TO MEASURE INTERVALS IN THE 4.3-MICRON CARBON DIOXIDE BAND AND THE OTHER A MICROWAVE DEVICE TO MEASURE RADIATION IN THE 9.5-MM OXYGEN BAND. PRESENTLY, THESE TWO ADDITIONAL UNITS WILL NOT FLY ON TIROS-N BUT WILL BE ADDED TO SUBSEQUENT MISSIONS (TIROS-M, -I, AND -J).

----- TIROS-N, UNKNOWN -----

EXPERIMENT NAME- DATA COLLECTION AND PLATFORM LOCATION
SYSTEM (DCS)

NSSDC ID- TIROS-N-03

LAST REPORTED STATE- *****UNKNOWN*****

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - UNKNOWN NASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THE DATA COLLECTION AND PLATFORM LOCATION SYSTEM (DCS) WILL BE DESIGNED TO MEET THE METEOROLOGICAL DATA NEEDS OF THE UNITED STATES AND TO SUPPORT THE GLOBAL ATMOSPHERIC RESEARCH PROGRAM (GARP). THE SYSTEM WILL RECEIVE LOW DUTY CYCLE TRANSMISSIONS OF METEOROLOGICAL OBSERVATIONS FROM FREE-FLOATING BALLOONS, OCEAN BUOYS, OTHER SATELLITES, AND FIXED GROUND-BASED SENSOR PLATFORMS DISTRIBUTED AROUND THE GLOBE. THE OBSERVATIONS FROM THESE RANDOMLY LOCATED SOURCES WILL BE ORGANIZED ON BOARD THE SPACECRAFT AND WILL BE RETRANSMITTED WHEN THE SPACECRAFT COMES IN RANGE OF A COMMAND AND DATA ACQUISITION (CDA) STATION. FOR THE FREE-MOVING BALLOONS, THE DOPPLER FREQUENCY SHIFT OF THE TRANSMITTER WILL BE OBSERVED TO CALCULATE THE LOCATION OF THE BALLOONS LATER. ALL INFORMATION RECEIVED BY THE SPACECRAFT WILL BE STORED IN A 320-KB SOLID-STATE BUFFER MEMORY. THE SYSTEM WILL BE BUILT WITH A READOUT CAPABILITY OF 0.8 KGS AS WELL AS AN 0-KGS CAPABILITY FOR DATA TRANSMISSION TO A CDA STATION. THE DCS SYSTEM WILL CONSIST OF THE RANDOM ACCESS MEASUREMENT (RAM) SYSTEM, WHICH WILL ALSO BE USED IN THE TROPICAL WIND ENERGY CONVERSION AND REFERENCE LEVEL EXPERIMENT (TWERLE) TO BE FLOWN ON NIMBUS-F.

***** UK 5 *****

SPACECRAFT COMMON NAME- UK 5
ALTERNATE NAMES- UNITED KINGDOM 5, PL-732B
NSSDC ID- 74-077A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/15/74.

LAUNCH DATE- 10/15/74 SPACECRAFT WEIGHT- 135. KG
LAUNCH SITE- SAN MARCO PLATFORM, OFF COAST OF KENYA
LAUNCH VEHICLE- SCOUT

SPONSORING COUNTRY/AGENCY

UNITED STATES SRC
NASA-DSS

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- / /
ORBIT PERIOD- 95.3 MIN INCLINATION- 2.875 DEG
PERIAPSIS- 512.93 KM ALT APOAPSIS- 557.23 KM ALT

RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- / /
ORBIT PERIOD- 95.3 MIN INCLINATION- 2.875 DEG
PERIAPSIS- 512.93 KM ALT APOAPSIS- 557.23 KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - M.L. EAKER NASA-GSFC
GREENBELT, MD

PS - S.S. MOLT NASA-GSFC
GREENBELT, MD

SPACECRAFT BRIEF DESCRIPTION

THE UK-5 SPACECRAFT CARRIED SIX EXPERIMENTS THAT MEASURED THE SPECTRUM, POLARIZATION, AND PULSAR FEATURES OF NON-SOLAR X-RAY SOURCES. THE SPACECRAFT WAS SPIN STABILIZED, AND TWO EXPERIMENTS SCANNED THE SKY PERPENDICULAR TO THE SPIN AXIS WHILE FOUR EXPERIMENTS POINTED PARALLEL TO THE SPIN AXIS. DATA ARE STORED ON BOARD THE SPACECRAFT IN A CORE STORAGE AND DUMPED TO GROUND STATIONS ONCE PER ORBIT.

----- UK 5, BODY -----

EXPERIMENT NAME- 0.3- TO 30-KEV COSMIC X RAY WITH A
ROTATION COLLIMATOR

NSSDC ID- 74-077A-01

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/16/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.L.P. ROYD U COLLEGE LONDON
LONDON, ENGLAND
OI - A.P. WILLMORE U COLLEGE LONDON
LONDON, ENGLAND
OI - P.W. SANFORD U COLLEGE LONDON
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT COMBINED THE FUNCTION OF OBSERVING X RAYS IN DIFFERENT ENERGY RANGES WITH THAT OF STAR TRACKING. THE EXPERIMENT CONTAINS A ROTATION COLLIMATOR, UTILIZING THE SATELLITE SPIN, BEHIND WHICH THERE ARE THREE DETECTORS. THE FIELD OF VIEW IS A CONE WITH A SEMI-ANGLE OF 10 DEG TO 20 DEG, DEPENDING ON THE TYPE OF RADIATION VIEWED BY THE DIFFERENT DETECTORS. THE FIRST DETECTOR IS A VISIBLE LIGHT PHOTOMULTIPLIER WHICH ENABLES THE SPIN AXIS TO BE ACCURATELY DETERMINED BY VIEWING THE BACKGROUND OF OPTICAL STARS. SECONDLY, THERE IS AN ARRAY OF CHANNEL ELECTRON MULTIPLIERS, WITH SELECTABLE FILTERS, COVERING THE WAVELENGTH RANGE 0.3 TO 6 KEV. THIRD, THERE IS A GROUP OF PROPORTIONAL COUNTERS COVERING THE RANGE 2.5 TO 30 KEV. IT IS BELIEVED THAT SOURCE POSITIONS COULD BE DETERMINED TO WITHIN 2 ARC-MIN FOR BRIGHT SOURCES.

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

----- UK 5, BOYD -----

EXPERIMENT NAME- HIGH RESOLUTION SOURCE SPECTRA

NSSDC ID- 74-077A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/31/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.L.F. BOYDU COLLEGE LONDON
LONDON, ENGLAND

OI - A.P. WILLMOREU COLLEGE LONDON
LONDON, ENGLAND

OI - P.W. SANFORDU COLLEGE LONDON
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A HIGH-RESOLUTION PROPORTIONAL COUNTER SPECTROMETER WITH A 128-CHANNEL PULSE HEIGHT ANALYZER AND RESPONDED TO PHOTONS IN THE 2- TO 30-KEV ENERGY RANGE. THE SPECTRA OF SOURCES WAS EXAMINED IN GREATER DETAIL THAN HAD BEEN PREVIOUSLY POSSIBLE. LINE EMISSION FOR CERTAIN ELEMENTS (E.G. IRON) COULD ALSO BE IDENTIFIED. THE DETECTOR VIEWED IN A DIRECTION PARALLEL TO THE SPIN AXIS AND, THEREFORE, CONTINUED TO OBSERVE THE SAME PIECE OF SKY FOR AS LONG AS THE POSITION OF THE SATELLITE SPIN AXIS REMAINED UNALTERED. THE EXPERIMENT AXIS POINTED APPROXIMATELY TWO DEG OFF THE SPIN AXIS, SO, WHEN OBSERVING A SOURCE ALSO TWO DEG OFF THE SPIN AXIS, THE SOURCE PASSED IN AND OUT OF THE FIELD OF VIEW DURING EACH ROTATION. THIS PERMITTED THE BACKGROUND FLUX TO BE SAMPLED EVERY SPIN PERIOD, BY RECORDING THE SPECTRAL INFORMATION IN FOUR SETS OF LOCATIONS, EACH CORRESPONDING TO A QUADRANT OF THE SPIN CYCLE. THIS SHOULD HAVE OVERCOME THE LACK OF INFORMATION ON POSSIBLE FLUCTUATIONS IN THE BACKGROUND FLUX DURING AN ORBIT INTEGRATION. THE EXPERIMENT COULD ALSO HAVE BEEN OPERATED IN A MODE IN WHICH PERIODICITIES IN THE RANGE TYPICAL OF PULSAR FREQUENCIES WERE DETECTED.

----- UK 5, ELLIOT -----

EXPERIMENT NAME- HIGH-ENERGY COSMIC X-RAY SPECTRA

NSSDC ID- 74-077A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/10/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H. ELLIOTIMPERIAL COLLEGE
LONDON, ENGLAND

OI - J.J. QUENBYIMPERIAL COLLEGE
LONDON, ENGLAND

OI - A.R. ENGELIMPERIAL COLLEGE
LONDON, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS DESIGNED TO EXTEND THE SPECTRAL INFORMATION ON SELECTED X-RAY SOURCES IN THE ENERGY REGION ABOVE 20 KEV. MEASUREMENTS WERE POSSIBLE UP TO 2 MEV, ALTHOUGH THE EFFICIENCY OF THE DETECTOR FELL STEEPLY AT THIS ENERGY. THE DETECTOR AXIS WAS INCLINED A FEW DEG WITH RESPECT TO THE SATELLITE SPIN AXIS SO THAT IS CONED AS THE SATELLITE SPUN. THE COUNTING RATE RESULTING FROM A POINT SOURCE A FEW DEG FROM THE SPIN AXIS WAS THUS MODULATED WITH THE SPIN PERIOD. THIS MODULATION WAS DETECTED BY DIVIDING THE SPIN CYCLE INTO FOUR SECTORS AND ANALYZING THE DIFFERENT COUNTING RATES IN EACH. IN THIS WAY, THE SOURCE INTENSITY COULD BE DETERMINED FROM THE AMPLITUDE OF THE MODULATION. FOR PULSAR OBSERVATIONS, A LARGE ENERGY WINDOW AT THE LOWER END OF THE DETECTOR RANGE WAS USED. THE OBSERVATIONS IN THIS ENERGY REGION WERE ANALYZED FOR A PULSAR PERIODICITY IN A SPECIAL SYSTEM WHICH WAS PART OF THE SPACECRAFT HANDLING ELECTRONICS.

----- UK 5, MOLT -----

EXPERIMENT NAME- ALL-SKY MONITOR

NSSDC ID- 74-077A-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/10/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.S. MOLTNASA-GSFC
GREENBELT, MD

OI - E.A. BOLDTNASA-GSFC
GREENBELT, MD

OI - P.J. SERLEMITSOSNASA-GSFC
GREENBELT, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT SCANNED THE X-RAY EMISSION FROM THE ENTIRE CELESTIAL SPHERE AT ALL TIMES, THEREBY COVERING THE LARGE AREAS THAT LAY OUTSIDE THE FIELD OF VIEW OF OTHER ON-BOARD EXPERIMENTS. IT WAS A VALUABLE AID IN PROGRAMMING SATELLITE MANEUVERS SO THAT TRANSIENT EVENTS IN THE X-RAY SKY, SUCH AS NEARBY NOVAE AND X-RAY FLARES, COULD BE RAPIDLY MADE AVAILABLE FOR STUDY, WITH GREATER RESOLUTION BY THE OTHER EXPERIMENTS.

----- UK 5, POUNDS -----

EXPERIMENT NAME- 2- TO 10-KEV SKY SURVEY

NSSDC ID- 74-077A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/10/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.A. POUNDSU OF LEICESTER
LEICESTER, ENGLAND

OI - D.A. COOKEU OF LEICESTER
LEICESTER, ENGLAND

OI - D.J. ADAMSU OF LEICESTER
LEICESTER, ENGLAND

OI - R.E. GRIFFITHSU OF LEICESTER
LEICESTER, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF A LARGE-AREA PROPORTIONAL COUNTER ARRANGED TO VIEW IN A DIRECTION PERPENDICULAR TO THE SATELLITE SPIN AXIS. THE SATELLITE ROTATION, THEREFORE, ALLOWED A SCAN OF A 360-DEG BAND OF THE SKY. WHEN THE SATELLITE SPIN AXIS WAS ARRANGED TO POINT AT A GALACTIC POLE, THE WHOLE OF THE MILKY WAY COULD BE SCANNED AT ONCE. THE EXPERIMENT COVERED THE PHOTON ENERGY RANGE 1.5 TO 20 KEV AND EFFECTED A HIGH-SENSITIVITY SURVEY, OBTAINING SOURCE LOCATIONS, INTENSITY, AND SPECTRA. A NUMBER OF DIFFERENT MODES OF OPERATION WAS USED IN WHICH THE AVAILABLE STORAGE SPACE IN THE CORE STORE OBTAINED SPATIAL INFORMATION AT THE EXPENSE OF SPECTRAL RESOLUTION OR CONVERSELY. THE SENSITIVITY OF THE EXPERIMENT ALLOWS THE DETECTION OF SOURCES OF THE ORDER OF 10 TO THE MINUS FOUR TIMES THE INTENSITY OF SCO XR-1. WITHIN THE TIME OF ABOUT ONE DAY, THE ABILITY OF THE SURVEY INSTRUMENTS TO DETERMINE THE POSITIONS OF A SOURCE DEPENDS ON THE STRENGTH OF THE SOURCE AND THE NUMBER OF OTHER SOURCES IN A GIVEN PART OF THE SKY. A SOURCE OF 5 X 10 TO THE MINUS THREE TIMES THE STRENGTH OF SCO XR-1 COULD BE LOCATED WITH A PRECISION OF ABOUT 15 ARC-MIN.

----- UK 5, POUNDS -----

EXPERIMENT NAME- POLARIMETER/SPECTROMETER

NSSDC ID- 74-077A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/10/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K.A. POUNDSU OF LEICESTER
LEICESTER, ENGLAND

OI - D.A. COOKEU OF LEICESTER
LEICESTER, ENGLAND

OI - D.J. ADAMSU OF LEICESTER
LEICESTER, ENGLAND

OI - R.E. GRIFFITHSU OF LEICESTER
LEICESTER, ENGLAND

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WAS A POLARIMETER/SPECTROMETER OPERATING IN THE 2- TO 8-KEV RANGE. IT USES TWO LARGE PLANE CRYSTALS, LITHIUM HYDRIDE AND GRAPHITE, IN A DRAGG SPECTROMETER WITH A HONEYCOMB COLLIMATOR. IT IS MOUNTED TO VIEW ALONG THE SATELLITE SPIN AXIS AND EXAMINE THE RADIATION OF INDIVIDUAL X-RAY SOURCES FOR POSSIBLE POLARIZATION AND FOR THE EXISTENCE OF LINE EMISSIONS. IN A SOURCE OF THE BRIGHTNESS OF THE CRAB NEBULA, A POLARIZATION OF 2.5 PERCENT MAY BE DETECTED. THE EXPERIMENT ALSO CONDUCTED SEARCHES FOR PULSAR ACTIVITY. THE NATURE OF THE EXPERIMENT MADE IT POSSIBLE TO EXAMINE THE POLARIZATION OF THE PULSAR ITSELF BY LOOKING FOR DIFFERENT PULSAR BEHAVIOR IN THE SEPARATE POLARIZATION COMPONENTS.

***** VELA 5A *****

SPACECRAFT COMMON NAME- VELA 5A

ALTERNATE NAMES- VELA 9 (TRW), 03954

VELA 5A (USAF)

NSSDC ID- 69-046D

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 05/23/69.

LAUNCH DATE- 05/23/69 SPACECRAFT WEIGHT- 571. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- TITAN 3C

SPONSORING COUNTRY/AGENCY
UNITED STATES DOD-USAF

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 05/23/69
ORBIT PERIOD- 6720. MIN INCLINATION- 32.3 DEG
PERIAPSIS- 111000. KM ALT APOAPSIS- 112000. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 05/23/69
ORBIT PERIOD- 6720. MIN INCLINATION- 32.3 DEG
PERIAPSIS- 111000. KM ALT APOAPSIS- 112000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUSAF-SAMSO
SAN BERNARDINO, CA

PS - J.H. COONLOS ALAMOS SCI LAB
LOS ALAMOS, NM

SPACECRAFT BRIEF DESCRIPTION

VELA 5A WAS ONE OF TWO SPIN-STABILIZED, ICOSAHEDRAL SATELLITES THAT COMPRISED THE FIFTH LAUNCH IN THE VELA PROGRAM. THE ORBITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII, INCLINED AT 60 DEG TO THE ECLIPTIC, AND SPACED 100 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE OBJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND COSMIC X RAYS, EUV, SOLAR PROTONS, SOLAR WIND, AND NEUTRONS, (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION, AND (3) TO PROVIDE SOLAR FLARE DATA IN SUPPORT OF MANNED SPACE MISSIONS. VELA 5A, AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES, HAD BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE, IMPROVED POWER REQUIREMENTS, BETTER THERMAL CONTROL OF OPTICAL SENSORS, AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 W WERE PROVIDED BY 22,500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. A ROTATION RATE OF 70 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL ORBIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUD ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY.

----- VELA 5A, NAME -----

EXPERIMENT NAME- SOLAR WIND EXPERIMENT

NSSDC ID- 69-0460-08

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 10/01/73.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.J. NAMELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.R. ASHWIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - H.E. FULTHAUSERLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

TWO ELECTROSTATIC ANALYZER-ELECTRON MULTIPLIER UNITS WERE USED TO STUDY THE INTERPLANETARY SOLAR WIND (INCLUDING HEAVY IONS) AND PROTONS AND ELECTRONS IN THE MAGNETOTAIL. ENERGY ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RESISTANCE CAPACITOR (RC) TIME CONSTANTS. PARTICLES IN A 6-DEG BY 100-DEG FAN-SHAPED ANGULAR RANGE WERE ACCEPTED FOR ANALYSIS DURING A DECAYING VOLTAGE CYCLE. THE 100-DEG DIMENSION WAS PARALLEL TO THE SPACECRAFT SPIN AXIS FOR BOTH DETECTORS. ONE ANALYZER-MULTIPLIER UNIT STUDIED SOLAR WIND ELECTRONS IN THE ENERGY RANGE FROM 7.5 EV TO 10.5 KEV AND SOLAR WIND POSITIVE IONS (MAINLY PROTONS AND ALPHA PARTICLES) IN AN ENERGY PER CHARGE RANGE FROM 120 V TO 5 KV. (THIS DETECTOR RETURNED USEFUL DATA UNTIL 4/12/72 WHEN IT FAILED). THE OTHER UNIT STUDIED MAGNETOTAIL PROTONS OR ELECTRONS BETWEEN 20 EV AND 31 KEV AND SOLAR WIND HEAVY IONS IN THE ENERGY PER CHARGE RANGE BETWEEN 1 KV AND 5.3 KV. THIS DETECTOR RETURNED USEFUL DATA UNTIL IT FAILED ON 8/17/73. HOWEVER THIS MALFUNCTION WAS OVERCOME AND GOOD DATA WERE OBTAINED FROM ABOUT 9/17/73 UNTIL PRESENT (5/24/74).

----- VELA 5A, NAME -----

EXPERIMENT NAME- NEUTRON DETECTOR

NSSDC ID- 69-0460-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 05/23/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.J. NAMELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.H. ASHWIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPORTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MODERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 MEV.

----- VELA 5A, CHAMBERS -----

EXPERIMENT NAME- SOLAR X-RAY DETECTORS, 0.5 TO 3.0 A,
1 TO 0.4 A, 1 TO 16 A, 44 TO 60 A

NSSDC ID- 69-0460-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 05/00/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.H. CHAMBERSLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.C. FULLERLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - W.E. KUNZLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

IN THIS EXPERIMENT, TWO IDENTICAL X-RAY DETECTORS OCCUPIED DIAMETRICALLY OPPOSED APEX POSITIONS TO MONITOR SOLAR X-RAYS IN SELECTED BANDS FROM 0.5 TO 60 A. EACH DETECTOR CONTAINED FOUR SENSORS -- THREE ION CHAMBERS AND ONE SCINTILLATOR-PHOTOMULTIPLIER. THE THREE ION CHAMBERS HAD A 1- TO 0.4- WAVELENGTH RANGE, A 1- TO 16-A RANGE, AND A 1- TO 16-A AND 44- TO 60-A RANGE, RESPECTIVELY. THE ION CHAMBERS WERE HEMISPHERICAL SO THAT THE TWO DETECTORS AFFORDED NEARLY A PI STERADIAN COVERAGE. THE FOURTH SENSOR WAS COMPOSED OF SODIUM IODIDE CRYSTALS COUPLED TO PHOTOMULTIPLIERS. THE WAVELENGTH RANGE WAS 0.5 TO 3.0 A, AND THE SOLAR ASPECT ANGLES WERE APPROXIMATELY +70 TO -70 DEG.

----- VELA 5A, KLEBESADEL -----

EXPERIMENT NAME- GAMMA-RAY ASTRONOMY

NSSDC ID- 69-0460-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 05/23/69.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. KLEBESADELLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - I.B. STRONGLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - R.A. OLSONLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT CONSISTED OF SIX 10-CM-CUBED CESIUM IODIDE SCINTILLATION COUNTERS DISTRIBUTED TO ACHIEVE NEARLY ISOTROPIC SENSITIVITY. INDIVIDUAL DETECTORS RESPONDED TO ENERGY DEPOSITIONS OF 0.2 TO 1.0 MEV WITH A DETECTION EFFICIENCY RANGING FROM 17 TO 50 PERCENT. THE SCINTILLATORS WERE SHIELDED AGAINST DIRECT PENETRATION BY ELECTRONS BELOW 0.75 MEV AND PROTONS BELOW 20 MEV. NO ACTIVE ANTICINCIDENCE SHIELDING WAS PROVIDED. NORMALIZED OUTPUT PULSES FROM THE SIX DETECTORS WERE SUMMED INTO COUNTING AND LOGICS CIRCUITRY. LOGICAL SENSING OF RAPID, STATISTICALLY SIGNIFICANT COUNT RATE INCREASES INITIATED THE RECORDING OF DISCRETE COUNTS IN A SERIES OF LOGARITHMICALLY INCREASING TIME INTERVALS. THIS CAPABILITY PROVIDED CONTINUOUS TEMPORAL COVERAGE WHICH, COUPLED WITH THE ISOTROPIC RESPONSE, IS UNIQUE IN ASTRONOMY. A TIME MEASUREMENT WAS ALSO ASSOCIATED WITH EACH RECORD. THE DATA ACCUMULATIONS INCLUDED A BACKGROUND COMPONENT DUE TO COSMIC PARTICLES AND THEIR SECONDARY EFFECTS. THE OBSERVED BACKGROUND RATE, WHICH WAS A FUNCTION OF THRESHOLD ENERGY, WAS ABOUT 150 COUNTS/SEC.

***** VELA 5B *****

SPACECRAFT COMMON NAME- VELA 5B
ALTERNATE NAMES- VELA 10 (TRW), 03955
VELA 5B (USAF)

NSSDC ID- 69-046E

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 05/23/69.

LAUNCH DATE- 05/23/69 SPACECRAFT WEIGHT- 571. KG
LAUNCH SITE- VANDENBERG AFB, UNITED STATES
LAUNCH VEHICLE- TITAN 3C

SPONSORING COUNTRY/AGENCY
UNITED STATES DOD-USAF

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 05/23/69
ORBIT PERIOD- 6720. MIN INCLINATION- 32.8 DEG
PERIAPSIS- 111000. KM ALT APOAPSIS- 112000. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEOCENTRIC EPOCH DATE- 05/23/69
ORBIT PERIOD- 6720. MIN INCLINATION- 32.8 DEG
PERIAPSIS- 111000. KM ALT APOAPSIS- 112000. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUSAF-SAN50

PS - J.H. COONLOS ALAMOS SCI LAB
LOS ALAMOS, NM

SPACECRAFT BRIEF DESCRIPTION

VELA 5B WAS ONE OF TWO SPIN-STABILIZED, ICOSAHEDRAL SATELLITES THAT COMPRISED THE SIXTH LAUNCH IN THE VELA PROGRAM. THE ORBITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII, INCLINED AT 60 DEG TO THE ECLIPTIC, AND SPACED 100 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE OBJECTIVES OF THE SATELLITES WERE -- (1) TO STUDY SOLAR AND COSMIC X RAYS, EUV, SOLAR PROTONS, SOLAR WIND, AND NEUTRONS, (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION, AND (3) TO PROVIDE SOLAR FLARE DATA IN SUPPORT OF MANNED SPACE MISSIONS. VELA 5B, AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES, HAD BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE, IMPROVED POWER REQUIREMENTS, BETTER THERMAL CONTROL OF OPTICAL SENSORS, AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 W WERE PROVIDED BY 22,500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. A ROTATION RATE OF 70 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL ORBIT INSERTION MAINTAINED NOMINAL ATTITUDE

CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY. THE SPACECRAFT AND ITS COMPLIMENT OF EXPERIMENTS FUNCTIONED NORMALLY FOR THREE YEARS, EXCEPT THAT THE SOLAR WIND ELECTROSTATIC ANALYZER FAILED IN JUNE 1969 AND THE EUV DETECTOR WAS TURNED OFF IN APRIL, 1972. IN JUNE OF 1972 ONE OF THE TWO ON BOARD DATA STORAGE UNITS FAILED. USE OF THE REMAINING GOOD UNIT WAS SUCH THAT NO USEFUL COSMIC GAMMA RAY DATA WAS OBTAINED BETWEEN JUNE 1972 AND JANUARY 1974 WHILE STORAGE MODE DATA FOR THE OTHER EXPERIMENTS WAS AVAILABLE. FROM JANUARY TO JULY 1974 USEFUL COSMIC GAMMA RAY DATA WAS AGAIN OBTAINED. WHILE ALL OTHER EXPERIMENTS WERE TRACKED ONLY IN REAL TIME (ABOUT 30 PERCENT COVERAGE). AFTER JULY 1974 THE ONLY USEFUL DATA WERE REAL TIME.

----- VELA 5B, DAME -----

EXPERIMENT NAME- SOLAR WIND EXPERIMENT

NSSDC ID- 69-046E-05

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/00/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.J. DAMELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.R. ASBRIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - H.E. FELTHAUSERLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

TWO ELECTROSTATIC ANALYZER-ELECTRON MULTIPLIER UNITS WERE USED TO STUDY THE INTERPLANETARY SOLAR WIND (INCLUDING HEAVY IONS) AND PROTONS AND ELECTRONS IN THE MAGNETOTAIL. ENERGY ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RESISTANCE CAPACITOR (RC) TIME CONSTANTS. PARTICLES IN A 6-DEG PARALLEL TO THE SPACECRAFT SPIN AXIS FOR BOTH DETECTORS. ONE DETECTOR UNIT WAS USED TO STUDY MAGNETOTAIL PROTONS OR ELECTRONS BETWEEN 20 EV AND 33 KPV AND SOLAR WIND HEAVY IONS IN THE ENERGY PER CHARGE RANGE BETWEEN 1 KV AND 8.3 KV. THIS UNIT OPERATED NORMALLY AT PRESENT (5/24/74), BUT HAS ABOUT 1/4 TO 1/3 DATA RECOVERY DUE TO REALLOCATION OF THE S/C TAPE RECORDER USAGE. THE OTHER DETECTOR UNIT, WHICH FAILED, WAS DESIGNED TO STUDY SOLAR WIND ELECTRONS IN THE ENERGY RANGE FROM 7.5 EV TO 10.5 KEV AND SOLAR WIND POSITIVE IONS (MAINLY PROTONS AND ALPHA PARTICLES) IN AN ENERGY PER CHARGE RANGE FROM 120 V TO 5 KV.

----- VELA 5B, DAME -----

EXPERIMENT NAME- NEUTRON DETECTOR

NSSDC ID- 69-046E-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/00/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.J. DAMELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.R. ASBRIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 0.10) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPORTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MODERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 MEV.

----- VELA 5B, CONNER -----

EXPERIMENT NAME- COSMIC X RAYS

NSSDC ID- 69-046E-06

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/00/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - J.P. CONNERLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - W.D. EVANSLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - R.D. DELIANLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE COSMIC X-RAY DETECTOR WAS A LARGE-AREA (26 CM SQUARED) SODIUM IODIDE SCINTILLATOR WITH A 5-MIL BERYLLIUM WINDOW. THE EXPERIMENT WAS DESIGNED TO PROVIDE MEASUREMENTS OF THE LOCATION, INTENSITY, AND INTENSITY VARIATIONS OF NONSOLAR X-RAY SOURCES OVER A LONG PERIOD OF TIME. THE DETECTOR WAS SENSITIVE TO X-RAY PHOTONS IN TWO ENERGY INTERVALS - (3 TO 6 KEV AND 3 TO 12 KEV), AND WAS SUFFICIENTLY SENSITIVE TO MONITOR FROM SIX TO TWELVE GALACTIC X-RAY SOURCES. ANY ONE SOURCE WAS VIEWED FOR APPROXIMATELY 1 HR. AND EVERY 2 DAYS EACH SOURCE WAS BACK IN VIEW. THREE MODES OF READOUT WERE AVAILABLE - (1) THE REAL TIME NORMAL MODE, IN WHICH COUNTS

FROM EACH ENERGY CHANNEL WERE TRANSMITTED EVERY SEC. (2) THE HIGH RESOLUTION MODE, IN WHICH ONLY THE 3- TO 12-KEV CHANNEL WAS TRANSMITTED EIGHT TIMES PER SEC. AND (3) THE STORE MODE, IN WHICH ONLY THE 3- TO 12-KEV CHANNEL WAS STORED.

----- VELA 5B, SINGER -----

EXPERIMENT NAME- SOLAR PARTICLE TELESCOPES

NSSDC ID- 69-046E-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/00/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S. SINGERLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - M.D. MONTGOMERYLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

THE SOLAR TELESCOPE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM AND ANGULAR DISTRIBUTION OF SOLAR PROTONS BETWEEN 0.3 AND 50 MEV AND OF SOLAR ALPHA PARTICLES BETWEEN 2 AND 100 MEV. IN ADDITION, THE EXPERIMENT WAS DESIGNED TO IDENTIFY AND MONITOR THE FLUX OF DEUTERIUM, TRITIUM, AND HELIUM-3 NUCLEI WHICH MAY BE EMITTED DURING A SOLAR PARTICLE FLARE AND TO MONITOR THE INTENSITY OF MORE HEAVILY IONIZED PARTICLES. THERE WERE THREE TELESCOPES IN A SINGLE PLANE, ORIENTED AT ANGLES OF 45 DEG, 90 DEG, AND 135 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS. EACH INSTRUMENT CONSISTED OF A COLLIMATING TUBE (PROVIDING AN ANGULAR VIEW OF 36 DEG) IN FRONT OF A SOLID-STATE DE/DX VS E PARTICLE DETECTOR.

----- VELA 5B, SINGER -----

EXPERIMENT NAME- ELECTRON DETECTORS

NSSDC ID- 69-046E-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 01/00/74.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S. SINGERLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - M.D. MONTGOMERYLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION

TWO SETS OF THREE SOLID-STATE ELECTRON DETECTORS IN A TELESCOPIC ARRANGEMENT WITH AN ANGULAR VIEW OF 30 DEG WERE USED TO OBSERVE ELECTRONS OVER THE RANGE 30 TO 150 KEV. PROTONS OF ENERGY LESS THAN 300 KEV AND GREATER THAN 50 MEV COULD ALSO BE DETECTED. ONE SET OF DETECTORS VIEWED THE PARTICLES DIRECTLY. THE OTHER UTILIZED A SCATTER GEOMETRY TO IMPROVE ABILITY TO OBSERVE ELECTRONS IN THE PRESENCE OF MUCH LARGER FLUXES OF PROTONS. EACH OF THE THREE DIRECT VIEW DETECTORS AND EACH OF THE THREE SCATTER GEOMETRY DETECTORS LAY IN A SINGLE PLANE AND MADE ANGLES OF 45 DEG, 90 DEG, AND 135 DEG WITH THE SPACECRAFT SPIN AXIS.

***** VELA 6A *****

SPACECRAFT COMMON NAME- VELA 6A
ALTERNATE NAMES- PL-702B, VELA 11 (TRW)
04366, VELA 6A (USAF)
NSSDC ID- 70-027A

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 04/00/70.

LAUNCH DATE- 04/03/70 SPACECRAFT WEIGHT- 770. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN 3

SPONSORING COUNTRY/AGENCY
UNITED STATES OSD-USAF

INITIAL ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 04/04/70
ORBIT PERIOD- 6729. MIN INCLINATION- 32.81 DEG
PERIAPSIS- 111210. KM ALT APOAPSIS- 112160. KM ALT

RECENT ORBIT PARAMETERS

ORBIT TYPE- GEOCENTRIC EPOCH DATE- 04/17/71
ORBIT PERIOD- 6701.1 MIN INCLINATION- 33.673 DEG
PERIAPSIS- 111139. KM ALT APOAPSIS- 117989. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUSAF-SAMSO
SAN BERNARDINO, CA
PS - J.H. COONLOS ALAMOS SCI LAB
LOS ALAMOS, NM

SPACECRAFT BRIEF DESCRIPTION

VELA 6A WAS ONE OF TWO SPIN-STABILIZED, ICOSAHEDRAL SATELLITES THAT COMPRISED THE SIXTH LAUNCH IN THE VELA PROGRAM. THE ORBITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII, INCLINED AT 60 DEG TO THE ECLIPTIC, AND SPACED 180 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE OBJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND COSMIC X RAYS, EUV, SOLAR PROTONS, SOLAR WIND, AND NEUTRONS, (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF

DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION, AND (3) TO PROVIDE SOLAR FLARE DATA IN SUPPORT OF MANNED SPACE MISSIONS. VELA 6A WAS AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES HAVING BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE, IMPROVED POWER REQUIREMENTS, BETTER THERMAL CONTROL OF OPTICAL SENSORS, AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 V WERE PROVIDED BY 22,500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. ROTATION RATES OF 78 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL ORBIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY. THE LAUNCH OF VELA 6A AND 6B, PLUS THE TWO ACTIVE VELAS STILL IN ORBIT (VELA 5A AND 5B), COMPLETED THE OBJECTIVES OF THE VELA PROGRAM.

----- VELA 6A, NAME -----

EXPERIMENT NAME- SOLAR WIND EXPERIMENT

NSSDC ID- 70-027A-05

LAST REPORTED STATE- LAUNCHED AND OPERATING PARTIALLY AT A SUBSTANDARD DATA ACQUISITION RATE SINCE 04/12/72.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S.J. NAMELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.R. ASBRIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - H.E. FOLTHAUSERLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
TWO ELECTROSTATIC ANALYZER-ELECTRON MULTIPLIER UNITS WERE USED TO STUDY THE INTERPLANETARY SOLAR WIND (INCLUDING HEAVY IONS) AND PROTONS AND ELECTRONS IN THE MAGNETOTAIL. ENERGY ANALYSIS WAS ACCOMPLISHED BY CHARGING THE PLATES TO KNOWN VOLTAGE LEVELS AND ALLOWING THEM TO DISCHARGE WITH KNOWN RC TIME CONSTANTS. PARTICLES IN A 6- BY 100-DEG PAN-SHAPED ANGULAR RANGE WERE ACCEPTED FOR ANALYSIS DURING A DECAYING VOLTAGE CYCLE. THE 100-DEG DIMENSION WAS PARALLEL TO THE SPACECRAFT SPIN AXIS FOR BOTH DETECTORS. ONE ANALYZER MULTIPLIER UNIT STUDIED SOLAR WIND ELECTRONS IN THE ENERGY RANGE FROM 7.5 EV TO 18.5 KEV AND SOLAR WIND POSITIVE IONS (MAINLY PROTONS AND ALPHA PARTICLES) IN AN ENERGY PER CHARGE RANGE FROM 120 V TO 5 KV. THIS DETECTOR OPERATED SUCCESSFULLY UNTIL ITS FAILURE ON 4/12/72. THE OTHER UNIT STUDIED MAGNETOTAIL PROTONS OR ELECTRONS BETWEEN 20 EV AND 33 KEV AND SOLAR WIND HEAVY IONS IN THE ENERGY PER CHARGE RANGE BETWEEN 1 AND 0.3 KV. THIS DETECTOR CONTINUES TO RETURN USEFUL DATA.

----- VELA 6A, NAME -----

EXPERIMENT NAME- NEUTRON DETECTOR

NSSDC ID- 70-027A-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 04/08/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S.J. NAMELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.R. ASBRIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPORTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MODERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 MEV.

----- VELA 6A, NAME -----

EXPERIMENT NAME- SOLAR X-RAY DETECTORS, 0.5 TO 3.0 A, 1 TO 8 A, 1 TO 16 A, 44 TO 60 A

NSSDC ID- 70-027A-02

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 04/08/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - W.H. CHAMBERSLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.C. FULLERLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - W.E. KUNZLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
TWO IDENTICAL X-RAY DETECTORS OCCUPIED DIAMETRICALLY OPPOSED APEX POSITIONS TO MONITOR SOLAR X RAYS IN SELECTED BANDS FROM 0.5 TO 60 A. EACH DETECTOR CONTAINED FOUR SENSORS -- THREE ION CHAMBERS AND ONE SCINTILLATOR-PHOTOMULTIPLIER. THE THREE ION CHAMBERS HAD A 1- TO 0-A WAVELENGTH RANGE, A 1- TO 16-A RANGE, AND A 1- TO 16-A AND 44- TO 60-A RANGE, RESPECTIVELY. THE 44- TO 60-A SIGNAL WAS THE DIFFERENCE BETWEEN THE LAST TWO ION CHAMBERS. THE ION CHAMBERS WERE HEMISPHERICAL SO THAT THE TWO DETECTORS AFFORDED NEARLY 4-PI STER COVERAGE. THE FOURTH SENSOR WAS COMPOSED OF SODIUM IODIDE CRYSTALS COUPLED TO PHOTOMULTIPLIERS. THE WAVELENGTH RANGE WAS

0.5 TO 3.0 A, AND THE SOLAR ASPECT ANGLES WERE APPROXIMATELY +70 TO -70 DEG.

----- VELA 6A, KLEBESADEL -----

EXPERIMENT NAME- GAMMA-RAY ASTRONOMY

NSSDC ID- 70-027A-08

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 04/08/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.W. KLEBESADELLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - I.D. STRONGLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - R.A. OLSONLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF SIX 10-CM-CUBED CESIUM IODIDE SCINTILLATION COUNTERS DISTRIBUTED TO ACHIEVE NEARLY ISOTROPIC SENSITIVITY. INDIVIDUAL DETECTORS RESPONDED TO ENERGY DEPOSITIONS OF 0.3 TO 1.5 MEV WITH A DETECTION EFFICIENCY RANGING FROM 17 TO 50 PERCENT. THE SCINTILLATORS WERE SHIELDED AGAINST DIRECT PENETRATION BY ELECTRONS BELOW 0.75 MEV AND PROTONS BELOW 20 MEV. NO ACTIVE ANTICOINCIDENCE SHIELDING WAS PROVIDED. NORMALIZED OUTPUT PULSES FROM THE SIX DETECTORS WERE SUMMED INTO COUNTING AND LOGICS CIRCUITRY. LOGICAL SENSING OF RAPID, STATISTICALLY SIGNIFICANT COUNT RATE INCREASES INITIATED THE RECORDING OF DISCRETE COUNTS IN A SERIES OF LOGARITHMICALLY INCREASING TIME INTERVALS. THIS CAPABILITY PROVIDED CONTINUOUS TEMPORAL COVERAGE WHICH, COUPLED WITH THE ISOTROPIC RESPONSE, WAS UNIQUE IN ASTRONOMY. A TIME MEASUREMENT WAS ALSO ASSOCIATED WITH EACH RECORD. THE DATA ACCUMULATIONS INCLUDED A BACKGROUND COMPONENT, DUE TO COSMIC PARTICLES AND THEIR SECONDARY EFFECTS. THE OBSERVED BACKGROUND RATE, WHICH WAS A FUNCTION OF THRESHOLD ENERGY, WAS ABOUT 20 COUNTS/SEC.

----- VELA 6A, SINGER -----

EXPERIMENT NAME- SOLAR PARTICLE TELESCOPES

NSSDC ID- 70-027A-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 04/08/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S. SINGERLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - M.D. MONTGOMERYLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
THE SOLAR TELESCOPE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM AND ANGULAR DISTRIBUTION OF SOLAR PROTONS BETWEEN 0.3 AND 50 MEV AND OF SOLAR ALPHA PARTICLES BETWEEN 2 AND 100 MEV. IN ADDITION, THE EXPERIMENT WAS DESIGNED TO IDENTIFY AND MONITOR THE FLUX OF DEUTERIUM, TRITIUM, AND HELIUM-3 NUCLEI WHICH MAY BE EMITTED DURING A SOLAR PARTICLE FLARE AND TO MONITOR THE INTENSITY OF MORE HEAVILY IONIZED PARTICLES. THERE WERE THREE TELESCOPES IN A SINGLE PLANE, ORIENTED AT ANGLES OF 45 DEG, 90 DEG, AND 135 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS. EACH INSTRUMENT CONSISTED OF A COLLIMATING TUBE (PROVIDING AN ANGULAR VIEW OF 30 DEG) IN FRONT OF A SOLID-STATE DE/DE/VS E PARTICLE DETECTOR.

----- VELA 6A, SINGER -----

EXPERIMENT NAME- ELECTRON DETECTORS

NSSDC ID- 70-027A-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY AT THE STANDARD DATA ACQUISITION RATE SINCE 04/08/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER, OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S. SINGERLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - M.D. MONTGOMERYLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
TWO SETS OF THREE SOLID-STATE ELECTRON DETECTORS IN A TELESCOPIC ARRANGEMENT WITH AN ANGULAR VIEW OF 30 DEG WERE USED TO OBSERVE ELECTRONS OVER THE RANGE 30 TO 150 KEV. PROTONS OF ENERGY LESS THAN 300 KEV AND GREATER THAN 80 KEV COULD ALSO BE DETECTED. ONE SET OF DETECTORS VIEWED THE PARTICLES DIRECTLY. THE OTHER UTILIZED A SCATTER GEOMETRY TO IMPROVE ITS ABILITY TO OBSERVE ELECTRONS IN THE PRESENCE OF MUCH LARGER FLUXES OF PROTONS. EACH OF THE THREE DIRECT-VIEW DETECTORS AND EACH OF THE THREE SCATTER GEOMETRY DETECTORS LAID IN A SINGLE PLANE AND MADE ANGLES OF 45 DEG, 90 DEG, AND 135 DEG WITH THE SPACECRAFT SPIN AXIS.

***** VELA 6B *****

SPACECRAFT COMMON NAME- VELA 6B
ALTERNATE NAMES- PL-702C, VELA 12 (TRY)
04368, VELA 6B (USAF)
NSSDC ID- 70-027B

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/08/70.

LAUNCH DATE- 04/08/70 SPACECRAFT WEIGHT- 770. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN 3

SPONSORING COUNTRY/AGENCY
UNITED STATES DOD-USAF

INITIAL ORBIT PARAMETERS
ORBIT TYPE- GEDCENTRIC EPOCH DATE- 04/11/70
ORBIT PERIOD- 6745. MIN INCLINATION- 32.52 DEG
PERIAPSIS- 111509. KM ALT APOAPSIS- 112160. KM ALT

RECENT ORBIT PARAMETERS
ORBIT TYPE- GEDCENTRIC EPOCH DATE- 04/10/71
ORBIT PERIOD- 6598.2 MIN INCLINATION- 33.3150 DEG
PERIAPSIS- 111071. KM ALT APOAPSIS- 110169. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - UNKNOWNUSAF-SANJO
SAN BERNARDINO, CA
PS - J.H. COONLOS ALAMOS SCI LAB
LOS ALAMOS, NM

SPACECRAFT BRIEF DESCRIPTION
VELA 6B WAS ONE OF TWO SPIN-STABILIZED, ICOSAEDRAL SATELLITES THAT COMPRISED THE SIXTH LAUNCH IN THE VELA PROGRAM. THE ORBITS OF THE TWO SATELLITES ON EACH LAUNCH WERE BASICALLY CIRCULAR AT ABOUT 17 EARTH RADII, INCLINED AT 60 DEG TO THE ECLIPTIC, AND SPACED 180 DEG APART, THUS PROVIDING A MONITORING CAPABILITY OF OPPOSITE SIDES OF THE EARTH. THE OBJECTIVES OF THE SATELLITES WERE (1) TO STUDY SOLAR AND COSMIC X RAYS, EUV, SOLAR PROTONS, SOLAR WIND, AND NEUTRONS; (2) TO CARRY OUT RESEARCH AND DEVELOPMENT ON METHODS OF DETECTING NUCLEAR EXPLOSIONS BY MEANS OF SATELLITE-BORNE INSTRUMENTATION, AND (3) TO PROVIDE SOLAR FLARE DATA IN SUPPORT OF MANNED SPACE MISSIONS. VELA 6B WAS AN IMPROVED VERSION OF THE EARLIER VELA SERIES SATELLITES HAVING BETTER COMMAND CAPABILITIES, INCREASED DATA STORAGE, IMPROVED POWER REQUIREMENTS, BETTER THERMAL CONTROL OF OPTICAL SENSORS, AND GREATER EXPERIMENTATION WEIGHT. POWER SUPPLIES OF 120 W WERE PROVIDED BY 23,500 SOLAR CELLS MOUNTED ON THE SPACECRAFT'S 20 FACES. A ROTATION RATE OF 78 RPM DURING TRANSFER ORBITS AND 1 RPM AFTER FINAL ORBIT INSERTION MAINTAINED NOMINAL ATTITUDE CONTROL. EIGHT WHIP ANTENNAS AND FOUR STUB ANTENNA ARRAYS AT OPPOSITE ENDS OF THE SPACECRAFT STRUCTURE WERE USED FOR GROUND COMMANDS AND TELEMETRY. THE LAUNCH OF VELA 6A AND 6B, PLUS THE TWO ACTIVE VELAS STILL IN ORBIT (VELA 5A AND 6), COMPLETED THE OBJECTIVES OF THE VELA PROGRAM.

----- VELA 6A, SAME -----

EXPERIMENT NAME- NEUTRON DETECTOR

NSSDC ID- 70-0278-07

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/08/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S.J. RAMELOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - J.R. ASBRIDGELOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
THE NEUTRON DETECTOR CONSISTED OF A LARGE (ABOUT 8 LB) POLYETHYLENE MODERATOR SURROUNDING TWO HELIUM-3 FILLED PROPORTIONAL COUNTERS. NEUTRONS BETWEEN 1 AND 100 MEV WERE THERMALIZED BY THE MODERATOR AND DETECTED BY THE COUNTERS. THE INSTRUMENT WAS ALSO SENSITIVE TO PROTONS ABOVE 25 MEV.

----- VELA 6F, KLEBSADEL -----

EXPERIMENT NAME- GAMMA-RAY ASTRONOMY

NSSDC ID- 70-0278-08

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/08/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - R.W. KLEBSADELLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - I.B. STRONGLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - R.A. OLSONLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
THIS EXPERIMENT CONSISTED OF SIX 10-CM-CUBED CESIUM IODIDE SCINTILLATION COUNTERS DISTRIBUTED TO ACHIEVE NEARLY ISOTROPIC SENSITIVITY. INDIVIDUAL DETECTORS RESPONDED TO ENERGY DEPOSITIONS OF 0.3 TO 1.5 MEV WITH A DETECTION EFFICIENCY RANGING FROM 17 TO 50 PERCENT. THE SCINTILLATORS WERE SHIELDED AGAINST DIRECT PENETRATION BY ELECTRONS BELOW 0.75 MEV AND PROTONS BELOW 20 MEV. NO ACTIVE ANTICINCIDENCE SHIELDING WAS PROVIDED. NORMALIZED OUTPUT PULSES FROM THE SIX DETECTORS WERE SUMMED INTO COUNTING AND LOGICS CIRCUITRY. LOGICAL SENSING OF RAPID, STATISTICALLY SIGNIFICANT COUNT RATE INCREASES INITIATED THE RECORDING OF DISCRETE COUNTS IN A SERIES OF LOGARITHMICALLY INCREASING TIME INTERVALS. THIS CAPABILITY PROVIDED CONTINUOUS TEMPORAL COVERAGE WHICH,

COUPLED WITH THE ISOTROPIC RESPONSE, WAS UNIQUE IN ASTRONOMY. A TIME MEASUREMENT WAS ALSO ASSOCIATED WITH EACH RECORD. THE DATA ACCUMULATIONS INCLUDED A BACKGROUND COMPONENT, DUE TO COSMIC PARTICLES AND THEIR SECONDARY EFFECTS, THE OBSERVED BACKGROUND RATE, WHICH WAS A FUNCTION OF THRESHOLD ENERGY, WAS ABOUT 20 COUNTS/SEC.

----- VELA 6B, SINGER -----

EXPERIMENT NAME- SOLAR PARTICLE TELESCOPES

NSSDC ID- 70-0278-03

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/08/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S. SINGERLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - M.D. MONTGOMERYLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
THE SOLAR TELESCOPE EXPERIMENT WAS DESIGNED TO MEASURE THE ENERGY SPECTRUM AND ANGULAR DISTRIBUTION OF SOLAR PROTONS BETWEEN 0.3 AND 80 MEV AND OF SOLAR ALPHA PARTICLES BETWEEN 2 AND 100 MEV. IN ADDITION, THE EXPERIMENT WAS DESIGNED TO IDENTIFY AND MONITOR THE FLUX OF DEUTERIUM, TRITIUM, AND HELIUM-3 NUCLEI WHICH MAY BE EMITTED DURING A SOLAR PARTICLE FLARE AND TO MONITOR THE INTENSITY OF MORE HEAVILY IONIZED PARTICLES. THERE WERE THREE TELESCOPES IN A SINGLE PLANE, ORIENTED AT ANGLES OF 45 DEG, 90 DEG, AND 135 DEG RELATIVE TO THE SPACECRAFT SPIN AXIS. EACH INSTRUMENT CONSISTED OF A COLLIMATING TUBE (PROVIDING AN ANGULAR VIEW OF 30 DEG) IN FRONT OF A SOLID-STATE DE/OK VS F PARTICLE DETECTOR.

----- VELA 6B, SINGER -----

EXPERIMENT NAME- ELECTRON DETECTORS

NSSDC ID- 70-0278-04

LAST REPORTED STATE- LAUNCHED AND OPERATING NORMALLY
AT THE STANDARD DATA ACQUISITION RATE SINCE 04/08/70.

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - S. SINGERLOS ALAMOS SCI LAB
LOS ALAMOS, NM
OI - M.D. MONTGOMERYLOS ALAMOS SCI LAB
LOS ALAMOS, NM

EXPERIMENT BRIEF DESCRIPTION
TWO SETS OF THREE SOLID-STATE ELECTRON DETECTORS IN A TELESCOPIC ARRANGEMENT WITH AN ANGULAR VIEW OF 30 DEG WERE USED TO OBSERVE ELECTRONS OVER THE RANGE 30 TO 150 KEV. PROTONS OF ENERGY LESS THAN 300 KEV AND GREATER THAN 50 MEV COULD ALSO BE DETECTED. ONE SET OF DETECTORS VIEWED THE PARTICLES DIRECTLY. THE OTHER UTILIZED A SCATTER GEOMETRY TO IMPROVE ITS ABILITY TO OBSERVE ELECTRONS IN THE PRESENCE OF MUCH LARGER FLUXES OF PROTONS. EACH OF THE THREE DIRECT-VIEW DETECTORS AND EACH OF THE THREE SCATTER GEOMETRY DETECTORS LAID IN A SINGLE PLANE AND MADE ANGLES OF 45 DEG, 90 DEG, AND 135 DEG WITH THE SPACECRAFT SPIN AXIS.

***** VIKING-A LANDER *****

SPACECRAFT COMMON NAME- VIKING-A LANDER
ALTERNATE NAMES- VIKING-A
NSSDC ID- VIKG-AL

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 3 QTR 75 SPACECRAFT WEIGHT- 598. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.S. MARTIN, JR.NASA-LARC
HAMPTON, VA
PS - G.L. SIERSENNASA-LARC
HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION
THIS SPACECRAFT WILL BE THE LANDING VEHICLE FOR THE TWO-PART SPACECRAFT MISSION. IT WILL SOFT-LAND ON THE MARTIAN SURFACE SOMEWHERE IN THE LATITUDE RANGE PLUS OR MINUS 30 DEG (PREDETERMINED FROM THE ORBITER VEHICLE EXPERIMENTS DESIGNED TO CHOOSE A LANDING SPOT). THE LIFETIME OF THE LANDER IS DESIGNED TO BE AT LEAST 30 DAYS AFTER LANDING. THE PRIME LANDING AREA WILL BE SELECTED FROM A LOW-ALTITUDE REGION, WITH A SECONDARY AREA ALSO PRESELECTED IN LOW-ALTITUDE REGIONS. IF THE PRIMARY SITE PROVES TO BE UNSATISFACTORY, THE SECONDARY AREA WILL BE EXAMINED FOR SELECTION. THE ORBITER WILL HAVE THE CAPABILITY OF BEING MADE SYNCHRONOUS WITH THE LANDER TO PROVIDE FOR DAILY RELAY AND LANDING SITE OBSERVATION FOR 90 DAYS. IT WILL ALSO BE CAPABLE OF OBTAINING DATA FOR THE SELECTION OF LANDING SITES FOR FUTURE MISSIONS. THE LANDER VEHICLE WILL CONTAIN THE MAJORITY OF EXPERIMENTS TO BE CONDUCTED ON MARS. THE LANDER WILL HAVE A 70-W POWER CAPACITY. THE SCIENTIFIC PAYLOAD FOR THE LANDER WILL WEIGH APPROXIMATELY 91 KG (200 LBS).

----- VIKING-A LANDER, ANDERSON -----

EXPERIMENT NAME- SEISMOLOGY

NSSDC ID- VIKG-AL-08

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.L. ANDERSONCALIF INST OF TECH
PASADENA, CA
OI - F. PRESSMASS INST OF TECH
CAMBRIDGE, MA
OI - M.N. TOKSOZMASS INST OF TECH
CAMBRIDGE, MA
OI - G. SUTTONU OF HAWAII
HONOLULU, HI
OI - R.L. KOVACHSTANFORD U
STANFORD, CA
OI - G.V. LATHANU OF TEXAS, GALVESTON
GALVESTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE SEISMOLOGY INVESTIGATION WILL BE TO DETERMINE THE SEISMIC BACKGROUND AND EVENT ACTIVITY OF MARS. THREE PERPENDICULAR COMPONENTS OF GROUND MOTION WILL BE MEASURED OVER A BROAD FREQUENCY RANGE AS PRACTICAL (MAXIMUM EMPHASIS OVER THE BAND 0.4 TO 4 HZ). THE RESOLUTION WILL BE 50 MILLIGRONS OR LESS OF GROUND DISPLACEMENT AT 1 HZ, WITH AN ACCURACY SUCH THAT TRUE GROUND MOTION AMPLITUDE CAN BE RECOVERED TO PLUS OR MINUS 10 PERCENT OR BETTER. DYNAMIC RANGE MAY BE INCREASED BY HARMONIC FILTERING OF THE SEISMIC DATA AT THREE FREQUENCIES. THE SEISMOGRAPH WILL BE MOUNTED IN THE EQUIPMENT AREA OF THE LANDER. THE ORIENTATION OF THE SENSOR WILL BE KNOWN TO WITHIN 15 DEG IN AZIMUTH AND 5 DEG IN ELEVATION. TRANSMISSIBILITY OF THE LANDER SHOULD BE GREATER THAN 0.4 FOR FREQUENCIES LESS THAN 10 HZ. THE LANDER SHALL HAVE NO RESONANCES LESS THAN 10 HZ WITH Q GREATER THAN TWO.

----- VIKING-A LANDER, DIEMANN -----

EXPERIMENT NAME- MOLECULAR ANALYSIS

NSSDC ID- VIKG-AL-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K. DIEMANNMASS INST OF TECH
CAMBRIDGE, MA
OI - H.C. UPFYU OF CALIF, SAN DIEGO
SAN DIEGO, CA
OI - D.M. ANDERSONUSA-CRREL
HANOVER, NH
OI - T. OWENSTATE U OF NEW YORK
BUFFALO, NY
OI - J. OROU OF HOUSTON
HOUSTON, TX
OI - L.E. ORGELSALK INST BIOL STUDIES
SAN DIEGO, CA
OI - G.P. SHULMANCASA LOMA COLLEGE
PACOMA, CA
OI - A.O.C. NIEPU OF MINNESOTA
MINNEAPOLIS, MN
OI - P. TOULMIN, 3RDUS GEOLOGICAL SURVEY
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS INVESTIGATION IS TO ANALYZE THE MARTIAN SURFACE FOR ITS ORGANIC CONTENT BY VAPORIZING MATERIAL ONTO A GAS CHROMATOGRAPHIC COLUMN WHICH WILL BE CONNECTED TO A FAST-SCANNING (10-SEC) MASS SPECTROMETER. THE HEATING WILL BE ACCOMPLISHED IN STEPS TO VAPORIZE THOSE MATERIALS PRESENT WHICH HAVE SUFFICIENT VAPOR PRESSURE, AND ULTIMATELY TO DECOMPOSE PYROLYTICALLY NONVOLATILE SUBSTANCES INTO VOLATILE DEGRADATION PRODUCTS FROM WHICH THE NATURE OF THE MATERIAL CAN THEN BE DEDUCED. TO ACCOMPLISH THE OBJECTIVES OF THIS INVESTIGATION, CERTAIN PRIMARY REQUIREMENTS MUST BE MET. THE SENSITIVITY OF THE MASS SPECTROMETER SHOULD BE SUCH THAT A MASS SPECTRUM TAKEN OF A SINGLE ORGANIC COMPOUND WHICH IS ONE PART IN TEN MILLION (0.1 PPM) SHOWS PEAKS WHICH ARE 1 PERCENT OF THE BASE PEAK. THE MASS RANGE REQUIRED FOR ANALYSIS WILL BE AT LEAST 12 TO 200, WITH UNIT RESOLUTION OR BETTER. THE RELATIVE DYNAMIC RANGE FOR EACH MASS SPECTRUM SHOULD BE 500 TO 1. A CONTROLLED TEMPERATURE WILL BE REQUIRED FOR VAPORIZATION PYROLYSIS UP TO 500 DEG C. PROVISIONS WILL BE MADE TO ENSURE THAT THE EVOLUTION OF LARGE QUANTITIES OF GAS (AS MUCH AS 10 PERCENT OF SAMPLE WEIGHT) DOES NOT IMPAIR THE FUNCTION OF THE MASS SPECTROMETER. THIS IS TO BE ACCOMPLISHED BY VENTING THE EXCESS GAS BEFORE IT REACHES THE MASS SPECTROMETER. THREE DIFFERENT SAMPLES TAKEN AT SPECIFIED TIMES DURING THE FIRST 60 DAYS OF THE MISSION (COVERING SEASONAL CHANGES) WILL BE STUDIED. THE ORGANIC INVESTIGATION WILL NOT BE INITIATED UNTIL AFTER THE OPERATION OF THE ATMOSPHERIC ANALYSES REQUIRED DURING THE FIRST THREE DAYS. ATMOSPHERIC ANALYSES WILL BE CARRIED OUT PERIODICALLY THROUGHOUT THE MISSION.

----- VIKING-A LANDER, MARGRAVES -----

EXPERIMENT NAME- MAGNETIC PROPERTIES

NSSDC ID- VIKG-AL-10

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.B. MARGRAVESPRINCETON U
PRINCETON, NJ

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, WHICH WILL BE PART OF THE LANDER SECTION EXPERIMENTS, WILL MEASURE THE MAGNETIC PROPERTIES OF THE SURFACE PARTICLES ON MARS USING THREE MAGNET ARRAYS FOR SAMPLING. DATA RETURNED WILL BE IN THE FORM OF IMAGES OF THE MAGNETIC ARRAYS.

----- VIKING-A LANDER, HESS -----

EXPERIMENT NAME- METEOROLOGY EXPERIMENT

NSSDC ID- VIKG-AL-07

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.L. HESSFLORIDA STATE U
TALLAHASSEE, FL
OI - C.R. LEOVYU OF WASHINGTON
SEATTLE, WA
OI - R.M. HENRYNASA-LARC
HAMPTON, VA
OI - J.A. RYANMC DONNELL-DOUGLAS CORP
HUNTINGTON BEACH, CA
OI - J.E. TILLMANU OF WASHINGTON
SEATTLE, WA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE METEOROLOGICAL ENVIRONMENT NEAR THE PLANETARY SURFACE AND OBTAIN INFORMATION ABOUT MOTION SYSTEMS OF VARIOUS SCALES. THE ELEMENTS TO BE DETERMINED ARE PRESSURE, TEMPERATURE, AND WIND VELOCITY AND DIRECTION OF THE MARTIAN ATMOSPHERE. DIURNAL AND TEMPORAL VARIATIONS OF THE PARAMETERS WILL BE OF PARTICULAR IMPORTANCE. THE SAMPLING RATES AND DURATIONS FOR ANY ONE MARTIAN DAY ARE TO BE SELECTABLE BY GROUND COMMAND. ALL MEASUREMENTS ARE TO BE CONTINUED FOR THE LANDER LIFETIME. THE SENSORS WILL BE MOUNTED ON AN ERECTABLE BOOM.

----- VIKING-A LANDER, KLEIN -----

EXPERIMENT NAME- BIOLOGY INVESTIGATION

NSSDC ID- VIKG-AL-03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.P. KLEINNASA-LARC
MOFFETT FIELD, CA
OI - J. LEDERBERGSTANFORD U
STANFORD, CA
OI - A. RICHMASS INST OF TECH
CAMBRIDGE, MA
OI - N.H. HORDWITZCALIF INST OF TECH
PASADENA, CA
OI - V.L. DYAMANASA-LARC
MOFFETT FIELD, CA
OI - G.V. LEVINBIOSPHERICS, INC
ROCKVILLE, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE COMPOSED OF THREE PARTS. IT WILL MEASURE -- (1) THE PHOTOSYNTHETIC AND RESPIRATORY FIXATION OF CARBON DIOXIDE, (2) THE CHANGES IN GAS COMPOSITION ABOVE A SURFACE SAMPLE IN CONTACT WITH A LIQUID MEDIUM, AND (3) THE CARBON DIOXIDE RELEASED FROM ADDED LABELED ORGANIC COMPOUNDS. IT WILL ATTEMPT TO DETERMINE THE PRESENCE OF LIFE ON MARS. THE CAPABILITY EXISTS TO STERILIZE A SAMPLE FOR CONTROL.

----- VIKING-A LANDER, MICHAEL, JR. -----

EXPERIMENT NAME- RADIO SCIENCE

NSSDC ID- VIKG-AL-11

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.H. MICHAEL, JR.NASA-LARC
HAMPTON, VA
OI - I.I. SHAPIROMASS INST OF TECH
CAMBRIDGE, MA
OI - G. FJELBONASA-JPL
PASADENA, CA
OI - J.G. DAVIESU OF MANCHESTER
MANCHESTER, ENGLAND
OI - D.L. CAINNASA-JPL
PASADENA, CA
OI - M.D. GROSSIRAYTHEON CORP
SUDBURY, MA
OI - G.L. TYLERSTANFORD U
STANFORD, CA

DI - J. ORENKLENASA-JPL
PASADENA, CA
DI - R.H. TOLSONNASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL UTILIZE THE LANDER-TO-EARTH AND ORBITER-TO-EARTH S-BAND COMMUNICATIONS LINK (INCLUDING RANGE AND RANGE-RATE CAPABILITIES), THE LANDER-TO-ORBITER UHF RELAY LINK, THE RADAR ALTIMETER, THE TERMINAL DESCENT LANDING RADAR, AND THE ORBITER-TO-EARTH X-BAND DOWNLINK. THE RESULTING DATA WILL BE USED TO DETERMINE THE MARTIAN GRAVITATIONAL FIELD, AXIS OF ROTATION, PERIAPIS, FIGURE, ATMOSPHERE, STRUCTURE, IONOSPHERE, AND SURFACE PROPERTIES. IN ADDITION, THE DATA WILL BE USED TO DETERMINE THE LANDER LOCATION, TO STUDY RELATIVITY, TO STUDY THE INTERPLANETARY MEDIUM, AND, IF CONDITIONS PERMIT, TO STUDY THE SOLAR CORONA.

----- VIKING-A LANDER, MUTCH -----

EXPERIMENT NAME- FACSIMILE CAMERA

NSSDC ID- VIKG-AL-06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.A. MUTCHBROWN U
PROVIDENCE, RI
OI - C. SAGANCORNELL U
ITHACA, NY
OI - A.B. BINDERPLANETARY SCIENCE INST
TUCSON, AZ
OI - E.C. MORRISUS GEOLOGICAL SURVEY
FLAGSTAFF, AZ
OI - A.T. YOUNGTEXAS A&M U
COLLEGE STATION, TX
OI - F.O. HUCKNASA-LARC
HAMPTON, VA
OI - E.C. LEVINthalSTANFORD U
ANFORD, CA
OI - S. LIEBES, JR.STANFORD U
STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE IMAGING INVESTIGATION FROM THE LANDER WILL BE TO VISUALLY CHARACTERIZE THE LANDING SITE, PROVIDING DATA WITH BIOLOGICAL, GEOLOGICAL, AND METEOROLOGICAL RELEVANCE. TWO CAMERAS WITH A 0.04-DEG SCANNING RESOLUTION WILL BE REQUIRED. THE VERTICAL FIELD OF VIEW FOR EACH CAMERA WILL BE 20 DEG. WITH A CAPABILITY OF OBTAINING A COMPLETE 0-TO 360-DEG HORIZONTAL PANORAMA. VERTICAL POINTING BY COMMAND FOR ANGULAR COVERAGE FROM 40 DEG ABOVE TO 60 DEG BELOW THE HORIZONTAL PLANE OF THE LANDER IN 10-DEG INCREMENTS WILL BE REQUIRED. AZIMUTH POINTING BY COMMAND WILL BE IN 2.5-DEG INCREMENTS. THE CAMERAS WILL BE MOUNTED AT LEAST 1.3 M ABOVE THE MARTIAN SURFACE AND MUST BE CAPABLE OF VIEWING TWO FOOTPADS AND AT LEAST 90 PERCENT OF THE AREA ACCESSIBLE TO THE SURFACE SAMPLER. EACH CAMERA MUST BE CAPABLE OF OBTAINING VISUAL COLOR IMAGERY. PROVISION HAS BEEN MADE TO OPERATE IN IR SPECTRAL BANDS BETWEEN 0.8 AND 1.1 MICRONS. HORIZONTAL STEREO WITH A MINIMUM BASE OF 0.8 M WILL BE REQUIRED.

----- VIKING-A LANDER, NIER -----

EXPERIMENT NAME- ENTRY-ATMOSPHERIC STRUCTURE

NSSDC ID- VIKG-AL-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.O.C. NIERU OF MINNESOTA
MINNEAPOLIS, MN
OI - M.B. MCLEODHARVARD U
CAMBRIDGE, MA
OI - W.B. HANSONU OF TEXAS, DALLAS
DALLAS, TX
OI - N.W. SPENCERNASA-GSFC
GREENBELT, MD
OI - A. SEIFFNASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT IS DESIGNED TO DETERMINE THE PRESSURE, TEMPERATURE, AND DENSITY VARIATIONS WITH ALTITUDE IN THE LOWER MARTIAN ATMOSPHERE THROUGH MEASUREMENT OF ACCELERATION, PRESSURE, AND TEMPERATURE. THE ACCELEROMETER OF THE GUIDANCE AND CONTROL SYSTEM WILL BE USED FOR THE ATMOSPHERIC STRUCTURE INVESTIGATION.

----- VIKING-A LANDER, NIER -----

EXPERIMENT NAME- ENTRY-ATMOSPHERIC COMPOSITION

NSSDC ID- VIKG-AL-12

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.O.C. NIERU OF MINNESOTA
MINNEAPOLIS, MN

OI - N.W. SPENCERNASA-GSFC
GREENBELT, MD
OI - M.B. MCLEODHARVARD U
CAMBRIDGE, MA
OI - W.B. HANSONU OF TEXAS, DALLAS
DALLAS, TX
OI - A. SEIFFNASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE VIKING ENTRY-ATMOSPHERIC COMPOSITION EXPERIMENT IS DESIGNED TO PROVIDE THE COMPOSITION DATA (FOR BOTH NEUTRAL AND CHARGED SPECIES) NEEDED TO DEFINE THE PRESENT PHYSICAL AND CHEMICAL STATE OF THE MARTIAN ATMOSPHERE. A DOUBLE-FOCUSING (ELECTROSTATIC AND MAGNETIC) MASS SPECTROMETER, MOUNTED IN AN OPENING IN THE AEROSHELL WITH ITS ELECTRON IMPACT OPEN ION SOURCE RECESSED BELOW THE SURFACE OF THE AEROSHELL, WILL BE USED TO MEASURE THE CONCENTRATIONS OF THE ATMOSPHERIC SPECIES THAT HAVE MASS-TO-CHARGE RATIOS FROM 1 TO 49. IT IS PLANNED THAT THE EXPERIMENT WILL OBTAIN ACCURATE ALTITUDE PROFILES OF ALL SPECIES, AND IN PARTICULAR FOR BOTH ATOMIC AND MOLECULAR OXYGEN, CARBON MONOXIDE, AND CARBON DIOXIDE. TWO COLLECTORS WILL BE USED -- ONE COVERING THE MASS RANGE FROM 1 TO 7 AMU AND THE OTHER SIMULTANEOUSLY COVERING THE RANGE FROM 7 TO 49 AMU. MASS SPECTRA WILL BE OBTAINED BY SWEEPING THE ION ACCELERATION VOLTAGE AND THE DEFLECTION VOLTAGE ACROSS THE ELECTROSTATIC PLATES. THE SWEEP PERIOD WILL BE APPROXIMATELY FIVE SEC. AND A DYNAMIC RANGE OF TEN TO THE FIFTH POWER WILL BE PROVIDED WITHIN EACH SPECTRUM. AFTER CALIBRATION, THE INSTRUMENT WILL BE SEALED UNDER VACUUM AND OPENED WHEN THE LANDER IS RELEASED FROM THE ORBITER. DURING ENTRY, THE LANDER WILL BE TRAVELING WITH ITS AXIS ORIENTED ESSENTIALLY ALONG THE VELOCITY VECTOR, SO THE AMBIENT SPECIES WILL ENTER AT AN ANGLE NORMAL TO THE ENTRANCE PLANE. A RETARDING POTENTIAL ANALYZER (RPA) WILL MEASURE THE IONOSPHERIC PROPERTIES OVER APPROXIMATELY THE SAME ALTITUDE RANGE AS THE MASS SPECTROMETER. ITS FRONT END WILL MATE TO THE AEROSHELL SO THAT THE ENTRANCE GRID IS NEARLY FLUSH TO THE SURFACE, WHICH WILL BE MADE CONDUCTING IN THE REGION OF THE RPA TO PROVIDE A GROUND PLANE. THE SPACE BETWEEN THE ENTRANCE AND COLLECTOR WILL BE ELECTRICALLY SEGMENTED BY FIVE GRIDS WHOSE POTENTIALS WILL DETERMINE THE ENERGY AND SIGN OF THE CHARGED PARTICLES THAT CAN REACH THE COLLECTOR. THE FIRST (ENTRANCE GRID), SECOND, AND LAST GRID TOGETHER WILL COMPRISE THE RETARDING GRID, AND THE FIFTH GRID, THE SUPPRESSOR GRID, WILL BE HELD AT A FIXED POTENTIAL OPPOSITE IN SIGN TO THAT ON THE RETARDING GRID. THREE DIFFERENT LINEAR VOLTAGE RAMPS WILL BE APPLIED IN SUCCESSION TO THE RETARDING GRID. ONE RAMP WILL COVER THE VOLTAGE RANGE FROM - 75 TO 0 V (IN ABOUT 1 SEC), USED TO MEASURE SOLAR WIND ELECTRONS AND IONOSPHERIC PHOTOELECTRONS. ANOTHER WILL COVER FROM +1.5 TO 0 V (IN ABOUT ONE SEC), AND MEASURE ELECTRON TEMPERATURES IN THE IONOSPHERE. THE LAST RAMP WILL COVER FROM +15 TO 0 V (IN ABOUT 2 SEC), AND PROVIDE ION TEMPERATURES AND ION CONCENTRATION DATA. WHEN THE LANDER IS ALIGNED WITH ITS AXIS ALONG THE VELOCITY VECTOR, LOW-ENERGY PLASMA WILL ENTER THE RPA AT AN ANGLE NEARLY NORMAL TO THE ENTRANCE GRID. EACH PARAMETER WILL BE EVALUATED APPROXIMATELY EVERY 4 KM IN ALTITUDE. A SMALL DISTANCE COMPARED TO THE ANTICIPATED SCALE HEIGHTS. MORE EXPERIMENT DETAIL CAN BE FOUND IN 'ENTRY SCIENCE EXPERIMENT FOR VIKING 1975,' BY A. G. C. NIER, ET AL., ICARUS, VOL. 16, PP. 74, 1972.

----- VIKING-A LANDER, SHORTHILL -----

EXPERIMENT NAME- PHYSICAL PROPERTIES INVESTIGATION

NSSDC ID- VIKG-AL-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. SHORTHILLU OF UTAH
SALT LAKE CITY, UT
OI - R.C. HUTTONTRW SYSTEMS GROUP
REDONDO BEACH, CA
OI - H.J. MOORE, 2NDUS GEOLOGICAL SURVEY
MENLO PARK, CA
OI - R.F. SCOTTCALIF INST OF TECH
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE PHYSICAL PROPERTIES EXPERIMENT INVESTIGATION WILL BE TO DETERMINE THE PHYSICAL PROPERTIES OF THE MARTIAN SURFACE AND ENVIRONMENT AT THE LANDING SITE. PRIMARILY USING ENGINEERING MEASUREMENTS AND SCIENTIFIC INSTRUMENTS REQUIRED TO MEET OTHER MISSION OBJECTIVES, IN PARTICULAR, IT WILL ATTEMPT TO DETERMINE SUCH PROPERTIES AS DULK DENSITY, BEARING STRENGTH, ANGLE OF REPOSE, COHESION, ANGLE OF INTERNAL FRICTION, PARTICLE CHARACTERISTICS, THERMAL PARAMETERS, EOLIAN TRANSPORTABILITY, TOPOGRAPHY, AND CERTAIN ENVIRONMENTAL PROPERTIES SUCH AS WIND, TEMPERATURE, AND SOLAR FLUX LEVELS. MAXIMUM USE WILL BE MADE OF HARDWARE AND INSTRUMENTS INTENDED FOR OTHER APPLICATIONS, SUCH AS THE MECHANICAL SUBSYSTEMS AND LANDER CAMERAS. ONLY PASSIVE DEVICES, SUCH AS MIRRORS AND LANDING LEG STROKE GAUGES, ARE BEING ADDED FOR THIS EXPERIMENT.

----- VIKING-A LANDER, TOULMIN, 3RD -----

EXPERIMENT NAME- X-RAY FLUORESCENCE SPECTROMETER

NSSDC ID- VIKG-AL-13

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - P. TOULMIN, 3RDUS GEOLOGICAL SURVEY
WASHINGTON, DC
OI - A.K. DAIRDPOMONA COLLEGE
CLAREMONT, CA
OI - K. KFILU OF NEW MEXICO
ALBUQUERQUE, NM
OI - H.J. ROSEUS GEOLOGICAL SURVEY
WASHINGTON, DC
OI - B.C. CLARKMARTIN-MARIETTA AEROSP
DENVER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL UTILIZE AN ENERGY-DISPERSIVE X-RAY FLUORESCENCE SPECTROMETER IN WHICH FOUR SEALED AND GAS-FILLED PROPORTIONAL COUNTERS WILL DETECT X RAYS FIITTED FROM SAMPLES OF THE MARTIAN SURFACE MATERIALS IRRADIATED BY X RAYS FROM RADIOISOTOPE SOURCES (IRON-55 AND CADMIUM-109). THE OUTPUT OF THE PROPORTIONAL COUNTERS WILL BE SUBJECTED TO PULSE HEIGHT ANALYSIS BY AN ONBOARD STEP-SCANNING SINGLE-CHANNEL ANALYZER WITH ADJUSTABLE COUNTING PERIODS. THIS INSTRUMENT WILL BE LOCATED INSIDE THE LANDER BODY, AND SAMPLES WILL BE DELIVERED TO IT BY THE LANDER SURFACE SAMPLER. CALIBRATION STANDARDS WILL BE AN INTEGRAL PART OF THE INSTRUMENT. RECONSTRUCTED SPECTRA ARE EXPECTED TO YIELD SURFACE COMPOSITION WITH ACCURACIES RANGING FROM A FEW TENS OF PARTS PER MILLION FOR TRACE ELEMENTS TO A FEW PERCENT FOR MAJOR ELEMENTS, DEPENDING UPON THE ELEMENT IN QUESTION.

***** VIKING-A ORBITER *****

SPACECRAFT COMMON NAME- VIKING-A ORBITER
ALTERNATE NAMES- PL-733A, VIKNG-A
NSSDC ID- VIKG-A

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 3 QTR 75 SPACECRAFT WEIGHT- 109% KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

PLANNED ORBIT PARAMETERS
ORBIT TYPE- MARSCENTRIC
ORBIT PERIOD- 1476. MIN INCLINATION- 34. DEG
PERIAPSIS- 1500. KM ALT APPAPSIS- 32500. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.S. MARTIN, JR.NASA-LARC
HAMPTON, VA
PS - G.A. SOPFENNASA-LARC
HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION

THE VIKING SPACECRAFT WILL CONSIST OF AN ORBITER AND A LANDER. THE ORBITER WILL BE CAPABLE OF ORBITING THE PLANET MARS IN A HIGH-ECCENTRICITY ELLIPTICAL ORBIT. A LANDER WILL SEPARATE FROM THE ORBITER, ENTER THE MARTIAN ATMOSPHERE, AND SOFT-LAND ON THE SURFACE. ORBITAL, ENTRY, AND SCIENTIFIC DATA FROM THE LANDER WILL BE COLLECTED AND TRANSMITTED TO EARTH. THE SPACECRAFT WILL BE A SOLAR-CELL-POWERED SATELLITE STABILIZED IN 3 AXES, USING INERTIAL AND CELESTIAL REFERENCES. BOTH THE ORBITER AND THE LANDER WILL HAVE A 90-DAY LIFE EXPECTANCY. THERE WILL BE 500-W POWER CAPACITY FOR THE ORBITER AND A 70-W CAPACITY FOR THE LANDER. SCIENTIFIC AND PHOTOGRAPHIC ANALYSIS INSTRUMENTS WILL WEIGH APPROXIMATELY 72 KG (150 LB).

***** VIKING-A ORBITER, CARR *****

EXPERIMENT NAME- ORBITER IMAGING

NSSDC ID- VIKG-A -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - M.H. CARRUS GEOLOGICAL SURVEY
MENLO PARK, CA
OI - W.A. RAUHLOWELL OBSERVATORY
FLAGSTAFF, AZ
OI - H. MASURSKYUS GEOLOGICAL SURVEY
FLAGSTAFF, AZ
OI - D.U. WISEU OF MASSACHUSETTS
AMHERST, MA
OI - G.A. RYGGISNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSES OF THE VIKING ORBITER TV IMAGING EXPERIMENT INVESTIGATION ARE TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS AND FUTURE MISSIONS, TO MONITOR THE REGION SURROUNDING THE LANDER, AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE GEOMETRIC RESOLUTION OF THE ORBITER IMAGING SYSTEM WILL BE 40 M PER LINE OR BETTER AT A REFERENCE ALTITUDE OF 1500 KM, WITH IMAGE SHEARING FROM ORBITER MOTION TO BE LESS THAN 50 PERCENT OF THIS RESOLUTION. PRIOR TO LANDER SEPARATION, THE ORBITER WILL BE REQUIRED TO PHOTOGRAPH WITH CONTIGUOUS PICTURES A SWATH AT LEAST 40 KM

CROSS-TRACK BY 500 KM DOWN-TRACK ON A SINGLE ORBITAL PASS FROM THE NEAR-PERIAPSIS PORTION OF THE ORBIT. THE NEAR-PERIAPSIS COVERAGE REQUIREMENT AFTER LANDER SEPARATION WILL OBTAIN COMPLETE COVERAGE WITH CONTIGUOUS PICTURES OF AN AREA AT LEAST 50 KM IN RADIUS CENTERED ON THE LANDER. TO OBTAIN BOTH BROAD AREA AND HIGH RESOLUTION COVERAGE, IT WILL BE REQUIRED THAT IMAGERY BE OBTAINABLE FROM THE PERIAPSIS AND APPAPSIS REGIONS OF THE ORBIT USING THE SAME IMAGING SYSTEM. THE DYNAMIC RANGE WILL BE 00 TO 1, AND THE SENSITIVITY WILL BE SUFFICIENT TO OBTAIN PICTURES AS CLOSE TO THE TERMINATOR AS 30 DEG WITH OPTIMUM IMAGE QUALITY AND AS CLOSE AS 5 DEG TO THE TERMINATOR WITH DEGRADED IMAGE QUALITY.

***** VIKING-A ORBITER, FARMER *****

EXPERIMENT NAME- IR SPECTROMETER -- WATER VAPOR MAPPING

NSSDC ID- VIKG-A -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - C.D. FARMERNASA-JPL
PASADENA, CA
OI - D.D. LAPORTESANTA BARBARA RES CTR
GOLETA, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE IR SPECTROMETRY EXPERIMENT WILL BE TO DETERMINE THE SPATIAL AND TEMPORAL DISTRIBUTION OF WATER VAPOR, TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS, AND (FOR FUTURE MISSIONS) TO MONITOR THE REGION SURROUNDING THE LANDER AND STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRARED SPECTROMETER WILL BE ORESIGHTED WITH THE IMAGING SYSTEM. IT WILL BE OPERABLE FROM THE PERIAPSIS AND APPAPSIS REGIONS OF THE ORBIT. THE WATER VAPOR MEASUREMENT RANGE WILL BE FROM 1 TO 1000 MICRONS OF PRECIPITABLE WATER WITH AN ACCURACY OF 1 MICRON BETWEEN 1 AND 20 MICRONS AND 5 PERCENT BETWEEN 20 AND 1000 MICRONS. THE INSTANTANEOUS FIELD OF VIEW OF THE INSTRUMENT IS 2 BY 16 MILLIRADIANS.

***** VIKING-A ORBITER, KIEFFER *****

EXPERIMENT NAME- IR RADIOMETRY -- THERMAL MAPPING

NSSDC ID- VIKG-A -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)
PI - M.H. KIEFFERU OF CALIF. LA
LOS ANGELES, CA
OI - G. MUNCHCALIF INST OF TECH
PASADENA, CA
OI - E.D. MINERNASA-JPL
PASADENA, CA
OI - G. NEUGEBAUERCALIF INST OF TECH
PASADENA, CA
OI - S.C. CHASE, JR.SANTA BARBARA RES CTR
GOLETA, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE INFRARED RADIOMETRY EXPERIMENT WILL BE TO OBTAIN SURFACE AND ATMOSPHERIC TEMPERATURE DATA FOR MARS, TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS, AND (FOR FUTURE MISSIONS) TO MONITOR THE REGIONS SURROUNDING THE LANDER AND STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRARED RADIOMETER WILL BE ORESIGHTED WITH THE IMAGING SYSTEM ON THE SCAN PLATFORM AND WILL BE OPERABLE FROM THE PERIAPSIS AND APPAPSIS REGIONS OF THE ORBIT. A TOTAL OF 28 DETECTORS IN FOUR TELESCOPES WILL COVER FIVE INFRARED WAVELENGTH BANDS AND THE INTEGRAL SOLAR SPECTRUM. THE TEMPERATURE RESOLUTION WILL BE 1 DEG K AT 200 DEG K, AND THE MEASUREMENT RANGE WILL BE FROM 140 TO 330 DEG K. THERE WILL BE SEVEN SIMULTANEOUS FIELDS OF VIEW ARRANGED IN A 4*4 PATTERN, EACH FIVE MILLIRADIANS IN DIAMETER.

***** VIKING-B LANDER *****

SPACECRAFT COMMON NAME- VIKING-B LANDER
ALTERNATE NAMES- VIKNG-B
NSSDC ID- VIKG-BL

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 3 QTR 75 SPACECRAFT WEIGHT- 590. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-OSS

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.S. MARTIN, JR.NASA-LARC
HAMPTON, VA
PS - G.A. SOPFENNASA-LARC
HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION

THIS SPACECRAFT WILL BE THE LANDING VEHICLE FOR THE TWO-PART SPACECRAFT MISSION. IT WILL SOFT-LAND ON THE MARTIAN SURFACE SOMEWHERE WITHIN 30 DEG OF THE MARTIAN EQUATOR. THE

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

LANDING SITE FOR THIS SECOND MISSION (VIKING-2) WILL BE SELECTED BASED ON KNOWLEDGE GAINED FROM THE VIKING-A LANDER'S OPERATION DURING ENTRY AND ON THE SURFACE AND FROM ORBITAL RECONNAISSANCE DATA OBTAINED EITHER BY THE VIKING-A ORBITER OR THE VIKING-D ORBITER DEPENDENT ON ARRIVAL AND SEPARATION. IF THE VIKING-A ORBITER IS USED THE RELAY OPERATION WILL NOT BE INTERRUPTED PRIOR TO ABOUT THE 20TH DAY ON THE SURFACE. THE SECOND LANDER WILL BE CAPABLE OF ACCOMPLISHING THE FIRST LANDER MISSION AS A BACKUP. THE LANDER WILL CARRY THE MAJORITY OF THE SCIENTIFIC EXPERIMENTS TO BE CONDUCTED ON MARS. IT WILL HAVE A 70-W POWER CAPACITY AND A SCIENTIFIC PAYLOAD OF APPROXIMATELY 91 KG (200 LBS.).

----- VIKING-B LANDER, ANDERSON -----

EXPERIMENT NAME- SEISMOLOGY

NSSDC ID- VIKG-BL-08

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - D.L. ANDERSONCALIF INST OF TECH
PASADENA, CA
OI - F. PRESSMASS INST OF TECH
CAMBRIDGE, MA
OI - H.N. TOKSOZMASS INST OF TECH
CAMBRIDGE, MA
OI - G. SUTTONU OF HAWAII
HONOLULU, HI
OI - R.L. KOVACHSTANFORD U
STANFORD, CA
OI - G.V. LATHAMU OF TEXAS, GALVESTON
GALVESTON, TX

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE SEISMOLOGY INVESTIGATION WILL BE TO DETERMINE THE SEISMIC BACKGROUND AND EVENT ACTIVITY OF MARS. THREE PERPENDICULAR COMPONENTS OF GROUND MOTION WILL BE MEASURED OVER AS BROAD A FREQUENCY RANGE AS PRACTICAL (MAXIMUM EMPHASIS OVER THE BAND 0.4 TO 4 HZ). THE RESOLUTION WILL BE 50 MILLIMICRONS OR LESS OF GROUND DISPLACEMENT AT 1 HZ, WITH AN ACCURACY SUCH THAT TRUE GROUND MOTION AMPLITUDE CAN BE RECOVERED TO PLUS OR MINUS 10 PERCENT OR BETTER. DYNAMIC RANGE MAY BE INCREASED BY NARROWBAND FILTERING OF THE SEISMIC DATA AT THREE FREQUENCIES. THE SEISMOMETER WILL BE MOUNTED IN THE EQUIPMENT AREA OF THE LANDER. THE ORIENTATION OF THE SENSOR WILL BE KNOWN TO WITHIN 15 DEG IN AZIMUTH AND 5 DEG IN ELEVATION. TRANSMISSIBILITY OF THE LANDER SHOULD BE GREATER THAN 0.8 FOR FREQUENCIES LESS THAN 10 HZ. THE LANDER SHALL HAVE NO RESONANCES LESS THAN 10 HZ WITH Q GREATER THAN TWO.

----- VIKING-D LANDER, BIEMANN -----

EXPERIMENT NAME- MOLECULAR ANALYSIS

NSSDC ID- VIKG-BL-04

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - K. BIEMANNMASS INST OF TECH
CAMBRIDGE, MA
OI - H.C. UREYU OF CALIF, SAN DIEGO
SAN DIEGO, CA
OI - D.M. ANDERSONUSA-CREL
HANOVER, NH
OI - T. OWENSTATE U OF NEW YORK
BUFFALO, NY
OI - J. ORDU OF HOUSTON
HOUSTON, TX
OI - L.E. ORGELSALK INST BIOL STUDIES
SAN DIEGO, CA
OI - G.P. SHULMANCASA LOMA COLLEGE
PACIFICA, CA
OI - A.D. CANNIERU OF MINNESOTA
MINNEAPOLIS, MN
OI - P. TOULMIN, JRUS GEOLOGICAL SURVEY
WASHINGTON, DC

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THIS INVESTIGATION IS TO ANALYZE THE MARTIAN SURFACE FOR ITS ORGANIC CONTENT BY VAPORIZING MATERIAL ONTO A GAS CHROMATOGRAPHIC COLUMN WHICH WILL BE CONNECTED TO A FAST-SCANNING (10-SFC) MASS SPECTROMETER. THE HEATING WILL BE ACCOMPLISHED IN STEPS TO VAPORIZE THOSE MATERIALS PRESENT WHICH HAVE SUFFICIENT VAPOR PRESSURE, AND ULTIMATELY TO DECOMPOSE PYROLYTICALLY NONVOLATILE SUBSTANCES INTO VOLATILE DEGRADATION PRODUCTS FROM WHICH THE NATURE OF THE MATERIAL CAN THEN BE DEDUCED. TO ACCOMPLISH THE OBJECTIVES OF THIS INVESTIGATION, CERTAIN PRIMARY REQUIREMENTS MUST BE MET. THE SENSITIVITY OF THE MASS SPECTROMETER SHOULD BE SUCH THAT A MASS SPECTRUM TAKEN OF A SINGLE ORGANIC COMPOUND WHICH IS ONE PART IN TEN MILLION (0.1 PPM) SHOWS PEAKS WHICH ARE 1 PERCENT OF THE BASE PEAK. THE MASS RANGE REQUIRED FOR ANALYSIS WILL BE AT LEAST 12 TO 200, WITH UNIT RESOLUTION SHOULD BE 500 TO RELATIVE DYNAMIC RANGE FOR EACH MASS SPECTRUM SHOULD BE 500 TO 1. A CONTROLLED TEMPERATURE WILL BE REQUIRED FOR VAPORIZATION. PYROLYSIS UP TO 500 DEG C. PROVISIONS WILL BE MADE TO ENSURE THAT THE EVOLUTION OF LARGE QUANTITIES OF GAS (AS MUCH AS 10 PERCENT OF SAMPLE WEIGHT) DOES NOT IMPAIR THE FUNCTION OF THE MASS SPECTROMETER. THIS IS TO BE ACCOMPLISHED BY VENTING THE

EXCESS GAS BEFORE IT REACHES THE MASS SPECTROMETER. THREE DIFFERENT SAMPLES TAKEN AT SPECIFIED TIMES DURING THE FIRST 60 DAYS OF THE MISSION (COVERING SEASONAL CHANGES) WILL BE STUDIED. THE ORGANIC INVESTIGATION WILL NOT BE INITIATED UNTIL AFTER THE OPERATION OF THE ATMOSPHERIC ANALYSES REQUIRED DURING THE FIRST THREE DAYS. ATMOSPHERIC ANALYSES WILL BE CARRIED OUT PERIODICALLY THROUGHOUT THE MISSION.

----- VIKING-B LANDER, HARGRAVES -----

EXPERIMENT NAME- MAGNETIC PROPERTIES

NSSDC ID- VIKG-BL-10

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.D. HARGRAVESPRINCETON U
PRINCETON, NJ

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT, WHICH WILL BE PART OF THE LANDER SECTION EXPERIMENTS, WILL MEASURE THE MAGNETIC PROPERTIES OF THE SURFACE PARTICLES ON MARS USING THREE MAGNET ARRAYS FOR SAMPLING. DATA RETURNED WILL BE IN THE FORM OF IMAGES OF THE MAGNETIC ARRAYS.

----- VIKING-B LANDER, HESS -----

EXPERIMENT NAME- METEOROLOGY EXPERIMENT

NSSDC ID- VIKG-BL-07

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - S.L. HESSFLORIDA STATE U
TALLAHASSEE, FL
OI - C.B. LEDVYU OF WASHINGTON
SEATTLE, WA
OI - R.W. HENRYNASA-LARC
HAMPTON, VA
OI - J.A. RYANHCOONNELL-DOUGLAS CORP
HUNTINGTON BEACH, CA
OI - J.E. TILLMANU OF WASHINGTON
SEATTLE, WA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL MEASURE THE METEOROLOGICAL ENVIRONMENT NEAR THE PLANETARY SURFACE AND OBTAIN INFORMATION ABOUT MOTION SYSTEMS OF VARIOUS SCALES. THE ELEMENTS TO BE DETERMINED ARE PRESSURE, TEMPERATURE, AND WIND VELOCITY AND DIRECTION OF THE MARTIAN ATMOSPHERE. DIURNAL AND TEMPORAL VARIATIONS OF THE PARAMETERS WILL BE OF PARTICULAR IMPORTANCE. THE SAMPLING RATES AND DURATIONS FOR ANY ONE MARTIAN DAY ARE TO BE SELECTABLE BY GROUND COMMAND. ALL MEASUREMENTS ARE TO BE CONTINUED FOR THE LANDER LIFETIME. THE SENSORS WILL BE MOUNTED ON AN ERECTABLE BOOM.

----- VIKING-B LANDER, KLEIN -----

EXPERIMENT NAME- BIOLOGY INVESTIGATION

NSSDC ID- VIKG-BL-03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - H.P. KLEINNASA-ARC
MOFFETT FIELD, CA
OI - J. LEDERBERGSTANFORD U
STANFORD, CA
OI - A. RICHMASS INST OF TECH
CAMBRIDGE, MA
OI - N.H. MORROWITZCALIF INST OF TECH
PASADENA, CA
OI - V.L. DYANANASA-ARC
MOFFETT FIELD, CA
OI - G.V. LEVINBIOSPHERICS, INC
ROCKVILLE, MD

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL BE COMPOSED OF THREE PARTS. IT WILL MEASURE - (1) THE PHOTOSYNTHETIC AND RESPIRATORY FIXATION OF CARBON DIOXIDE, (2) THE CHANGES IN GAS COMPOSITION ABOVE A SURFACE SAMPLER IN CONTACT WITH A LIQUID MEDIUM, AND (3) THE CARBON DIOXIDE RELEASED FROM ADDED LABILED ORGANIC COMPOUNDS. IT WILL ATTEMPT TO DETERMINE THE PRESENCE OF LIFE ON MARS. THE CAPABILITY EXISTS TO STERILIZE A SAMPLE FOR A CONTROL.

----- VIKING-B LANDER, MICHAEL, JR. -----

EXPERIMENT NAME- RADIO SCIENCE

NSSDC ID- VIKG-BL-11

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - W.H. MICHAEL, JR. NASA-LARC
HAMPTON, VA
DI - I.I. SHAPIRO MASS INST OF TECH
CAMBRIDGE, MA
DI - G. FJELDD NASA-JPL
PASADENA, CA
DI - J.G. DAVIES U OF MANCHESTER
MANCHESTER, ENGLAND
DI - D.L. CAIN NASA-JPL
PASADENA, CA
DI - M.D. GROSSI RAYTHEON CORP
SUDDURY, MA
DI - G.L. TYLER STANFORD U
STANFORD, CA
DI - J. PRENKLE NASA-JPL
PASADENA, CA
DI - R.H. TOLSON NASA-LARC
HAMPTON, VA

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL UTILIZE THE LANDER-TO-EARTH AND ORBITER-TO-EARTH S-BAND COMMUNICATIONS LINK (INCLUDING RANGE AND RANGE-RATE CAPABILITIES), THE LANDER-TO-ORBITER UHF RELAY LINK, THE RADAR ALTIMETER, THE TERMINAL DESCENT LANDING RADAR, AND THE ORBITER-TO-EARTH X-BAND DOWNLINK. THE RESULTING DATA WILL BE USED TO DETERMINE THE MARTIAN GRAVITATIONAL FIELD, AXIS OF ROTATION, EPOCH, FIGURE, ATMOSPHERE, STRUCTURE, IONOSPHERE, AND SURFACE PROPERTIES. IN ADDITION, THE DATA WILL BE USED TO DETERMINE THE LANDER LOCATION, TO STUDY RELATIVITY, TO STUDY THE INTERPLANETARY MEDIUM, AND, IF CONDITIONS PERMIT, TO STUDY THE SOLAR CORONA.

----- VIKING-B LANDER, HUTCH -----

EXPERIMENT NAME- FACSIMILE CAMERA

NSSDC ID- VIKG-BL-06

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - T.A. HUTCH BROWN U
PROVIDENCE, RI
DI - C. SAGAN CORNELL U
ITHACA, NY
DI - A.B. BINDER PLANETARY SCIENCE INST
TUCSON, AZ
DI - E.C. MORRIS US GEOLOGICAL SURVEY
FLAGSTAFF, AZ
DI - A.T. YOUNG TEXAS A&M U
COLLEGE STATION, TX
DI - F.O. HUCK NASA-LARC
HAMPTON, VA
DI - E.C. LEVINTHAL STANFORD U
STANFORD, CA
DI - S. LIEBES, JR. STANFORD U
STANFORD, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE IMAGING INVESTIGATION FROM THE LANDER WILL BE TO VISUALLY CHARACTERIZE THE LANDING SITE, PROVIDING DATA WITH BIOLOGICAL, GEOLOGICAL, AND METEOROLOGICAL RELEVANCE. TWO CAMERAS WITH A 0.04-DEG SCANNING RESOLUTION WILL BE REQUIRED. THE VERTICAL FIELD OF VIEW FOR EACH CAMERA WILL BE 20 DEG WITH A CAPABILITY OF OBTAINING A COMPLETE 0- TO 360-DEG HORIZONTAL PANORAMA. VERTICAL POINTING BY COMMAND FOR ANGULAR COVERAGE FROM 40 DEG ABOVE TO 60 DEG BELOW OUTER EDGE OF FIELD-OF-VIEW. THE HORIZONTAL PLANE OF THE LANDER IN 10-DEG INCREMENTS WILL BE REQUIRED. AZIMUTH POINTING BY COMMAND WILL BE IN 2.5-DEG INCREMENTS. THE CAMERAS WILL BE MOUNTED AT LEAST 1.3 M ABOVE THE MARTIAN SURFACE AND MUST BE CAPABLE OF VIEWING TWO FOOTPADS AND AT LEAST 90 PERCENT OF THE AREA ACCESSIBLE TO THE SURFACE SAMPLER. EACH CAMERA MUST BE CAPABLE OF OBTAINING VISUAL COLOR IMAGERY. PROVISION WILL BE MADE TO OPERATE IN IR SPECTRAL BANDS BETWEEN 0.4 AND 1.1 MICRONS. HORIZONTAL STEREO WITH A MINIMUM BASE OF 0.4 M WILL BE REQUIRED.

----- VIKING-B LANDER, NIER -----

EXPERIMENT NAME- ENTRY-ATMOSPHERIC STRUCTURE

NSSDC ID- VIKG-BL-02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.D.C. NIER U OF MINNESOTA
MINNEAPOLIS, MN
DI - M.B. MCLEOD HARVARD U
CAMBRIDGE, MA
DI - W.B. HANSON U OF TEXAS, DALLAS
DALLAS, TX
DI - N.W. SPENCER NASA-GSFC
GREENBELT, MD
DI - A. SEIFF NASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE PARTICULAR ELEMENTS OF MARTIAN ATMOSPHERIC STRUCTURE TO BE DETERMINED WILL BE PRESSURE, TEMPERATURE, AND DENSITY VARIATIONS WITH ALTITUDE IN THE LOWER MARTIAN ATMOSPHERE. THE

MEASUREMENTS TO BE MADE TO DETERMINE THESE ATMOSPHERIC PARAMETERS ARE SPACECRAFT ACCELERATION, PRESSURE, AND TEMPERATURE. THE ACCELEROMETER OF THE GUIDANCE AND CONTROL SYSTEM WILL BE USED FOR THE ATMOSPHERIC STRUCTURE INVESTIGATION.

----- VIKING-B LANDER, NIER -----

EXPERIMENT NAME- ENTRY-ATMOSPHERIC COMPOSITION

NSSDC ID- VIKG-BL-12

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - A.D.C. NIER U OF MINNESOTA
MINNEAPOLIS, MN
DI - N.W. SPENCER NASA-GSFC
GREENBELT, MD
DI - M.B. MCLEOD HARVARD U
CAMBRIDGE, MA
DI - W.B. HANSON U OF TEXAS, DALLAS
DALLAS, TX
DI - A. SEIFF NASA-ARC
MOFFETT FIELD, CA

EXPERIMENT BRIEF DESCRIPTION

THE VIKING ENTRY-ATMOSPHERIC COMPOSITION EXPERIMENT IS DESIGNED TO PROVIDE THE COMPOSITION DATA (FOR BOTH NEUTRAL AND CHARGED SPECIES) NEEDED TO DEFINE THE PRESENT PHYSICAL AND CHEMICAL STATE OF THE MARTIAN ATMOSPHERE. A DOUBLE-FOCUSING (ELECTROSTATIC AND MAGNETIC) MASS SPECTROMETER, MOUNTED IN AN OPENING IN THE AEROSHELL WITH ITS ELECTRON IMPACT 'OPEN' ION SOURCE RECESSED BELOW THE SURFACE OF THE AEROSHELL, WILL BE USED TO MEASURE THE CONCENTRATIONS OF THE ATMOSPHERIC SPECIES THAT HAVE MASS-TO-CHARGE RATIOS FROM 1 TO 49. IT IS PLANNED THAT THE EXPERIMENT WILL OBTAIN ACCURATE ALTITUDE PROFILES OF ALL SPECIES, SPECIFICALLY FOR BOTH ATOMIC AND MOLECULAR OXYGEN, CARBON MONOXIDE, AND CARBON DIOXIDE. TWO COLLECTORS WILL BE USED, ONE FOR THE MASS RANGE FROM 1 TO 7 AMU, AND THE OTHER SIMULTANEOUSLY MEASURING IN THE MASS RANGE FROM 7 TO 49 AMU. MASS SPECTRA WILL BE OBTAINED BY SWEETING THE ION ACCELERATION VOLTAGE AND THE DEFLECTION VOLTAGE ACROSS THE ELECTROSTATIC PLATES. THE SWEEP PERIOD WILL BE APPROXIMATELY FIVE SEC, AND A DYNAMIC RANGE OF TEN TO THE FIFTH POWER WILL BE PROVIDED WITHIN EACH SPECTRUM. A RETARDING POTENTIAL ANALYZER (RPA) WILL MEASURE THE IONOSPHERIC PROPERTIES OVER APPROXIMATELY THE SAME ALTITUDE RANGE AS THE MASS SPECTROMETER. ITS FRONT END WILL MATE TO THE AEROSHELL SO THAT THE ENTRANCE GRID IS NEARLY FLUSH TO THE SURFACE, WHICH IS MADE CONDUCTING IN THE REGION OF THE RPA TO PROVIDE A GROUND PLANE. THE SPACE BETWEEN THE ENTRANCE GRID AND COLLECTOR WILL BE ELECTRICALLY SEGMENTED BY FIVE GRIDS WHOSE POTENTIALS WILL DETERMINE THE ENERGY AND SIGN OF THE CHARGED PARTICLES THAT CAN REACH THE COLLECTOR. THREE DIFFERENT LINEAR VOLTAGE RAMPS WILL BE APPLIED IN SUCCESSION TO THE RETARDING GRID, ONE RAMP WILL COVER THE VOLTAGE RANGE FROM -75 V TO 0 V (IN ABOUT 1 SEC), WHICH WILL BE USED TO MEASURE SOLAR WIND ELECTRONS AND IONOSPHERIC PHOTOELECTRONS, ANOTHER RAMP WILL COVER FROM 1.5 V TO 0 V (IN ABOUT 1 SEC), AND MEASURE ELECTRON TEMPERATURES IN THE IONOSPHERE AND THE LAST FROM 115 V TO 0 V (IN ABOUT 2 SEC), WHICH WILL BE USED TO PROVIDE ION TEMPERATURE AND ION CONCENTRATION DATA. MORE EXPERIMENT DETAILS CAN BE FOUND IN 'ENTRY SCIENCE EXPERIMENT FOR VIKING 1979,' ICARUS, VOL 16, PP. 74-91, 1972, BY A. D. NIER, ET AL.

----- VIKING-B LANDER, SHORTHILL -----

EXPERIMENT NAME- PHYSICAL PROPERTIES INVESTIGATION

NSSDC ID- VIKG-BL-01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
DI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - R.W. SHORTHILL U OF UTAH
SALT LAKE CITY, UT
DI - R.E. HUTTON TRW SYSTEMS GROUP
REDONDO BEACH, CA
DI - H.J. MOORE, 2ND US GEOLOGICAL SURVEY
MENLO PARK, CA
DI - R.P. SCOTT CALIF INST OF TECH
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSE OF THE PHYSICAL PROPERTIES EXPERIMENT INVESTIGATION WILL BE TO DETERMINE THE PHYSICAL PROPERTIES OF THE MARTIAN SURFACE AND ENVIRONMENT AT THE LANDING SITE. PRIMARILY USING ENGINEERING MEASUREMENTS AND SCIENTIFIC INSTRUMENTS REQUIRED TO MEET OTHER MISSION OBJECTIVES. IN PARTICULAR, IT WILL ATTEMPT TO DETERMINE SUCH PROPERTIES AS BULK DENSITY, BEARING STRENGTH, ANGLE OF REPOSE, COHESION, ANGLE OF INTERNAL FRICTION, PARTICLE CHARACTERISTICS, THERMAL PARAMETERS, EOLIAN TRANSPORTABILITY, TOPOGRAPHY, AND CERTAIN ENVIRONMENTAL PROPERTIES SUCH AS WIND, TEMPERATURE, AND SOLAR FLUX LEVELS. MAXIMUM USE WILL BE MADE OF HARDWARE AND INSTRUMENTS INTENDED FOR OTHER APPLICATIONS, SUCH AS THE MECHANICAL SUBSYSTEMS AND LANDER CAMERAS. ONLY PASSIVE DEVICES, SUCH AS MIRRORS AND LANDING LEG STROKE GAUGES, ARE BEING ADDED FOR THIS EXPERIMENT.

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

----- VIKING-B LANDER, TOULMIN, JR -----

EXPERIMENT NAME- X-RAY FLUORESCENCE SPECTROMETER

NSDDC ID- VIKG-BL-13

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - P. TOULMIN, JRUS GEOLOGICAL SURVEY
WASHINGTON, DC

OI - A.K. DAIRDPOMONA COLLEGE
CLAREMONT, CA

OI - K. KEILU OF NEW MEXICO
ALBUQUERQUE, NM

OI - H.J. ROSEUS GEOLOGICAL SURVEY
WASHINGTON, DC

OI - D.C. CLARKMARTIN-MARIETTA AEROSP
DENVER, CO

EXPERIMENT BRIEF DESCRIPTION

THIS EXPERIMENT WILL UTILIZE AN ENERGY-DISPERSIVE X-RAY FLUORESCENCE SPECTROMETER IN WHICH FOUR SEALED AND GAS-FILLED PROPORTIONAL COUNTERS WILL DETECT X RAYS EMITTED FROM SAMPLES OF THE MARTIAN SURFACE MATERIALS IRRADIATED BY X RAYS FROM RADIOISOTOPE SOURCES (IRON-55 AND CADMIUM-109). THE OUTPUT OF THE PROPORTIONAL COUNTERS WILL BE SUBJECTED TO PULSE HEIGHT ANALYSIS BY AN ONBOARD STEP-SCANNING SINGLE-CHANNEL ANALYZER WITH ADJUSTABLE COUNTING PERIODS. THIS INSTRUMENT WILL BE LOCATED INSIDE THE LANDER BODY, AND SAMPLES WILL BE DELIVERED TO IT BY THE LANDER SURFACE SAMPLER. CALIBRATION STANDARDS WILL BE AN INTEGRAL PART OF THE INSTRUMENT. RECONSTRUCTED SPECTRA ARE EXPECTED TO YIELD SURFACE COMPOSITION WITH ACCURACIES RANGING FROM A FEW TENS OF PARTS PER MILLION FOR TRACE ELEMENTS TO A FEW PERCENT FOR MAJOR ELEMENTS, DEPENDING UPON THE ELEMENT IN QUESTION.

***** VIKING-B ORBITER *****

SPACECRAFT COMMON NAME- VIKING-B ORBITER

ALTERNATE NAMES- PL-7330, VIKING-B
NSDDC ID- VIKG-B

LAST REPORTED STATE- AN APPROVED MISSION

LAUNCH DATE- 3 QTR 75 SPACECRAFT WEIGHT- 1170. KG
LAUNCH SITE- CAPE CANAVERAL, UNITED STATES
LAUNCH VEHICLE- TITAN-CENT

SPONSORING COUNTRY/AGENCY
UNITED STATES NASA-DSN

PLANNED ORBIT PARAMETERS

ORBIT TYPE- HARSCESTRIC INCLINATION- 49. DEG
ORBIT PERIOD- 1476. MIN APOAPSIS- 32500. KM ALT
PERIAPSIS- 1500. KM ALT

SPACECRAFT PERSONNEL (PM=PROJECT MANAGER, PS=PROJECT SCIENTIST)
PM - J.S. MARTIN, JR.NASA-LARC
HAMPTON, VA

PS - G.A. SOPFENNASA-LARC
HAMPTON, VA

SPACECRAFT BRIEF DESCRIPTION

THE VIKING SPACECRAFT WILL CONSIST OF AN ORBITER AND A LANDER. THE ORBITER WILL BE CAPABLE OF ORBITING THE PLANET MARS IN A HIGH-ECCENTRICITY ELLIPTICAL ORBIT. A LANDER WILL SEPARATE FROM THE ORBITER, ENTER THE MARTIAN ATMOSPHERE, AND SOFT-LAND ON THE SURFACE. ORBITAL, ENTRY, AND SCIENTIFIC DATA FROM THE LANDER WILL BE COLLECTED AND TRANSMITTED TO EARTH. THE SPACECRAFT WILL BE A SOLAR-CELL-POWERED SATELLITE STABILIZED IN 3 AXES, USING INERTIAL AND CELESTIAL REFERENCES. BOTH THE ORBITER AND THE LANDER WILL HAVE A 90-DAY LIFE EXPECTANCY. THERE WILL BE 500-W POWER CAPACITY FOR THE ORBITER AND A 70-W CAPACITY FOR THE LANDER. SCIENTIFIC AND PHOTOGRAPHIC ANALYSIS INSTRUMENTS WILL WEIGH APPROXIMATELY 72 KG (150 LB).

----- VIKING-B ORBITER, CARR -----

EXPERIMENT NAME- ORBITER IMAGING

NSDDC ID- VIKG-B -01

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - M.H. CARRUS GEOLOGICAL SURVEY
MENLO PARK, CA

OI - W.A. DAUMLOWELL OBSERVATORY
FLAGSTAFF, AZ

OI - H. MASURSKYUS GEOLOGICAL SURVEY
FLAGSTAFF, AZ

OI - D.U. WISEU OF MASSACHUSETTS
AMHERST, MA

OI - G.A. BRIGGSNASA-JPL
PASADENA, CA

OI - J.A. CUTTSNASA-JPL
PASADENA, CA

EXPERIMENT BRIEF DESCRIPTION

THE PURPOSES OF THE VIKING ORBITER TV IMAGING EXPERIMENT INVESTIGATION ARE TO AID IN THE SELECTION OF LANDING SITES FOR

THE VIKING LANDERS AND FOR FUTURE MISSIONS, TO MONITOR THE REGION SURROUNDING THE LANDER, AND TO STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE GEOMETRIC RESOLUTION OF THE ORBITER IMAGING SYSTEM WILL BE 40 METERS PER LINE OR BETTER AT A REFERENCE ALTITUDE OF 1500 KM WITH IMAGE SHEARING FROM ORBITER MOTION TO BE LESS THAN 50 PERCENT OF THIS RESOLUTION. PRIOR TO LANDER SEPARATION, IT WILL BE REQUIRED TO COVER COMPLETELY WITH CONTIGUOUS PICTURES A SWATH AT LEAST 40 KM CROSS-TRACK BY 900 KM DOWN-TRACK ON A SINGLE ORBITAL PASS FROM THE NEAR-PERIAPSIS OF THE ORBIT. THE NEAR-PERIAPSIS COVERAGE EQUIPMENT AFTER LANDER SEPARATION WILL BE TO OBTAIN COMPLETE COVERAGE WITH CONTIGUOUS PICTURES OF AN AREA AT LEAST 50 KM IN RADIUS, CENTERED ON THE LANDER, ON A SINGLE ORBITAL PASS. THE CAPABILITIES PROVIDED TO ACCOMPLISH THE ABOVE REQUIREMENTS WILL BE UTILIZED TO ACCOMPLISH THE OTHER CITED PURPOSES. TO OBTAIN BOTH BROAD-AREA AND HIGH-RESOLUTION COVERAGE, IT WILL BE REQUIRED THAT IMAGERY BE OBTAINABLE FROM ONE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT USING THE SAME IMAGING SYSTEM. THE DYNAMIC RANGE WILL BE 80 TO 1, AND THE SENSITIVITY WILL BE SUFFICIENT TO OBTAIN PICTURES AS CLOSE TO THE TERMINATOR AS 30 DEG WITH OPTIMUM IMAGE QUALITY AND AS CLOSE AS 5 DEG TO THE TERMINATOR WITH DEGRADED IMAGE QUALITY.

----- VIKING-B ORBITER, FARNER -----

EXPERIMENT NAME- IR SPECTROMETER -- WATER VAPOR MAPPING

NSDDC ID- VIKG-B -03

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - C.O. FARNERNASA-JPL
PASADENA, CA

OI - D.D. LAPORTESANTA BARBARA RES CTR
GOLETA, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE IR SPECTROMETER EXPERIMENT WILL BE TO DETERMINE THE SPATIAL AND TEMPORAL DISTRIBUTION OF WATER VAPOR, TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS, AND (FOR FUTURE MISSIONS) TO MONITOR THE REGION SURROUNDING THE LANDER AND STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRARED SPECTROMETER WILL BE OBSIGHTED WITH THE IMAGING SYSTEM. IT WILL BE OPERABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT. THE WATER VAPOR MEASUREMENT RANGE WILL BE FROM 1 TO 1000 MICRON OF PRECIPITABLE WATER WITH AN ACCURACY OF 1 MICRON BETWEEN 1 AND 20 MICRONS AND 5 PERCENT BETWEEN 20 AND 1000 MICRONS. THE INSTANTANEOUS FIELD OF VIEW OF THE INSTRUMENT IS 2 BY 16 MILLIRADIANS.

----- VIKING-B ORBITER, KIEFFER -----

EXPERIMENT NAME- IR RADIOMETRY -- THERMAL MAPPING

NSDDC ID- VIKG-B -02

LAST REPORTED STATE- APPROVED

EXPERIMENT PERSONNEL (PI=PRINCIPAL INVESTIGATOR, TL=TEAM LEADER
OI=OTHER INVESTIGATOR, TM=TEAM MEMBER)

PI - M.H. KIEFFERU OF CALIF, LA
LOS ANGELES, CA

OI - G. HUNCHCALIF INST OF TECH
PASADENA, CA

OI - F.D. MINERNASA-JPL
PASADENA, CA

OI - G. NEUGERBAUERCALIF INST OF TECH
PASADENA, CA

OI - S.C. CHASE, JR.SANTA BARBARA RES CTR
GOLETA, CA

EXPERIMENT BRIEF DESCRIPTION

THE OBJECTIVES OF THE INFRARED RADIOMETRY EXPERIMENT WILL BE TO OBTAIN SURFACE AND ATMOSPHERIC TEMPERATURE DATA FOR MARS, TO AID IN THE SELECTION OF LANDING SITES FOR THE VIKING LANDERS, AND (FOR FUTURE MISSIONS) TO MONITOR THE REGION SURROUNDING THE LANDER AND STUDY THE DYNAMIC CHARACTERISTICS OF MARS. THE INFRARED RADIOMETER WILL BE OBSIGHTED WITH THE IMAGING SYSTEM ON THE SCAN PLATFORM AND WILL BE OPERABLE FROM THE PERIAPSIS AND APOAPSIS REGIONS OF THE ORBIT. A TOTAL OF 28 DETECTORS IN FOUR TELESCOPES WILL COVER FIVE INFRARED WAVELENGTH BANDS AND THE INTEGRAL SOLAR SPECTRUM. THE TEMPERATURE RESOLUTION WILL BE 1 DEG K AT 200 DEG K, AND THE MEASUREMENT RANGE WILL BE FROM 140 TO 330 DEG K. THERE WILL BE SEVEN SIMULTANEOUS FIELDS OF VIEW ARRANGED IN A 4X4 PATTERN, EACH FIVE MILLIRADIANS IN DIAMETER.

3. INDEXES FOR ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS

This section contains (1) an alphabetical listing by spacecraft name, including both common and alternate names, of all active and planned spacecraft and experiments, (2) a listing, ordered by last name, of the investigators or team members associated with the experiments and their current affiliations, (3) a listing of current experiment institutions ordered by institution name, giving the experiments with which each is associated, and (4) phenomenon measured indexes consisting of bar graphs and listings that provide an indication of active and planned space sciences measurements.

3.1 INDEX OF ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS

The following pages contain a list of the names of all spacecraft and experiments that were either active or planned as of September 30, 1974. The spacecraft are listed alphabetically by both common and alternate names. The alternate names are printed with a reference to the NSSDC spacecraft common name. Next to the NSSDC spacecraft common name are printed the sponsoring country and agency, launch date, orbit type, NSSDC ID code, and status. The epoch date, status, and data rate of all launched spacecraft and/or experiments are listed under the CURRENT STATE heading. For prelaunch spacecraft entries, only the status will be shown under this heading; there will be no information for prelaunch spacecraft experiments in this column. The status and data rate, for the most part, reflect the values as of September 30, 1974, that became effective as of the date shown in the EPOCH date column. However, a few changes subsequent to this date may appear. An explanation of the terms used in these columns may be found in Appendix A - Definitions of this report. The experiments are listed following the associated spacecraft common name and are ordered alphabetically by the principal investigator's or team leader's last name. The experiment name, NSSDC ID code, and experiment status are also given for each experiment. Finally, each name is followed by a page number referencing the description of the spacecraft or experiment found in this report.

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

INDEX OF ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS
BY SPACECRAFT NAMES AND PRINCIPAL INVESTIGATOR

* * *****	SPACECRAFT NAME *PRINC. INVEST. NAME *	COUNTRY AND AGENCY EXPERIMENT NAME	LAUNCH DATE	ORBIT TYPE	* * *****	NSSOC ID	EPOCH HHDDYY	CURRENT STATE STATUS	DATA RATE	PAGE NO.
AD-1	SEE DADE-A									
AD-2	SEE DADE-B									
AD-A	D'SULLIVAN, JR.	UNITED STATES SATELLITE DRAG ATMOSPHERIC DENSITY	NASA-OSS 12/19/63	GEOCENTRIC		63-053A 63-053A-01	06/00/67 12/19/63	PARTIAL PARTIAL	SUBS SUBS	7 7
AD-C	KEATING	UNITED STATES SATELLITE DRAG ATMOSPHERIC DENSITY	NASA-OSS 08/08/68	GEOCENTRIC		68-066A 68-066A-01	06/00/71 08/08/68	PARTIAL NORMAL	STD STD	7 7
AE-C	BARTH BRACE BRINTON CHAMPION DOERING HANSON HAYS HEATH HINTEREGGER HOFFMAN HOFFMAN NIER RICE RICE SPENCER	UNITED STATES ULTRAVIOLET NITRIC-OXIDE EXPERIMENT ELECTRON TEMPERATURE AND CONCENTRATION ATMOSPHERIC DRAG PHOTOELECTRON SPECTROMETER ION TEMPERATURE AIRGLOW PHOTOMETER SOLAR EUV FILTER PHOTOMETER SOLAR EUV SPECTROPHOTOMETER MAGNETIC ION-MASS SPECTROMETER LOW-ENERGY ELECTRONS OPEN SOURCE NEUTRAL MASS SPECTROMETER CLOSED SOURCE NEUTRAL MASS SPECTROMETER CAPACITANCE MANOMETER COLD CATHODE ION GAUGE NEUTRAL GAS TEMPERATURE AND CONCENTRATION	NASA-OSS 12/16/73	GEOCENTRIC		73-101A 73-101A-13 73-101A-01 73-101A-11 73-101A-02 73-101A-03 73-101A-04 73-101A-14 73-101A-05 73-101A-06 73-101A-10 73-101A-12 73-101A-07 73-101A-15 73-101A-16 73-101A-09	12/16/73 12/16/73 12/16/73 12/16/73 12/17/73 12/16/73 12/16/73 12/16/73 12/16/73 12/16/73 12/16/73 12/16/73 12/16/73 12/16/73 12/16/73 12/16/73 12/16/73	NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL	STD STD STD STD STD STD STD STD STD STD STD STD STD STD STD STD STD	7 8 8 8 8 8 9 9 9 9 9 10 10 10 10 11
AE-D	BARTH BRACE CHAMPION DOERING HANSON HAYS HINTEREGGER HOFFMAN HOFFMAN NIER PELZ RICE RICE SPENCER	UNITED STATES ULTRAVIOLET NITRIC-OXIDE EXPERIMENT ELECTRON TEMPERATURE AND CONCENTRATION ATMOSPHERIC DRAG PHOTOELECTRON SPECTROMETER ION TEMPERATURE AIRGLOW PHOTOMETER SOLAR EUV SPECTROPHOTOMETER ION COMPOSITION AND CONCENTRATION LOW-ENERGY ELECTRONS OPEN SOURCE NEUTRAL MASS SPECTROMETER CLOSED SOURCE NEUTRAL MASS SPECTROMETER CAPACITANCE MANOMETER COLD CATHODE ION GAUGE NEUTRAL GAS TEMPERATURE AND CONCENTRATION	NASA-OSS MARCH 75	GEOCENTRIC		AE-D AE-D AE-D AE-D AE-D AE-D AE-D AE-D AE-D AE-D AE-D AE-D AE-D AE-D AE-D	-11 -01 -02 -03 -04 -13 -06 -10 -12 -07 -08 -14 -15 -09	APPROVED		11 11 11 12 12 12 12 12 13 13 14 14 14
AE-E	BRACE BRINTON CHAMPION DOERING HANSON HAYS HEATH HINTEREGGER NIER PELZ RICE RICE SPENCER	UNITED STATES ELECTRON TEMPERATURE AND CONCENTRATION ION COMPOSITION AND CONCENTRATION ATMOSPHERIC DRAG PHOTOELECTRON SPECTROMETER ION TEMPERATURE AIRGLOW PHOTOMETER SOLAR EUV FILTER PHOTOMETER SOLAR EUV SPECTROPHOTOMETER OPEN SOURCE NEUTRAL MASS SPECTROMETER CLOSED SOURCE NEUTRAL MASS SPECTROMETER CAPACITANCE MANOMETER COLD CATHODE ION GAUGE NEUTRAL GAS TEMPERATURE AND CONCENTRATION	NASA-OSS SEPT. 75	GEOCENTRIC		AE-E AE-E AE-E AE-E AE-E AE-E AE-E AE-E AE-E AE-E AE-E AE-E AE-E	-01 -10 -02 -03 -04 -11 -05 -06 -07 -08 -12 -13 -09	APPROVED		14 15 15 15 15 16 16 16 16 17 17 17 17
AEROS 2	KRANKOWSKY NESKE ROEMER SCHMIDTKE SPENCER SPENNER	FED REP OF GERMANY UNITED STATES MASS SPECTROMETER (MS) ELECTRON CONCENTRATION IN THE IONOSPHERE ATMOSPHERIC DRAG ANALYSIS FLUX AND SPECTRAL DISTRIBUTION OF SOLAR EUV RAD AND THEIR TEMP AND SPATIAL VAR NEUTRAL ATMOSPHERE TEMPERATURE EXPERIMENT ENERGY DISTRIBUTION OF IONS AND ELECTRONS	GFW NASA-OSS 07/16/74	GEOCENTRIC		74-055A 74-055A-01 74-055A-03 74-055A-06 74-055A-04 74-055A-05 74-055A-02	08/06/74 08/06/74 08/06/74 08/06/74 08/06/74 08/06/74 08/06/74	PARTIAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL	SUBS SUBS SUBS SUBS SUBS SUBS SUBS	18 18 18 18 18 18 19
AEROS-B	SEE AEROS 2									
ALOUETTE 2	BELROSE BRACE HARTZ MCDIARMID WHITTEKFR	CANADA UNITED STATES VLF RECEIVER CYLINDRICAL ELECTROSTATIC PROBE COSMIC RADIO NOISE ENERGETIC PARTICLES DETECTORS SWEEP FREQUENCY SOUNDER	CRC NASA-OSS 11/29/65	GEOCENTRIC		65-098A 65-098A-02 65-098A-05 65-098A-03 65-098A-04 65-098A-01	03/01/73 03/01/73 03/01/73 03/01/73 03/01/73 03/01/73	PARTIAL NORMAL NORMAL NORMAL NORMAL NORMAL	SUBS SUBS SUBS SUBS SUBS SUBS	19 19 19 19 20 20
ALOUETTE-B	SEE ALOUETTE 2									
ALPO	SEE LUNAR POLAR ORB-DAUGHTER									
ALPO	SEE LUNAR POLAR ORB-MOTHER									
ALSEP 12	SEE APOLLO 12 LM/ALSEP									
ALSEP 14	SEE APOLLO 14 LM/ALSEP									
ALSEP 15	SEE APOLLO 15 LM/ALSEP									

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

INDEX OF ACTIVE AND PLANNED SPACECRAFT AND EXPERIMENTS
BY SPACECRAFT NAMES AND PRINCIPAL INVESTIGATOR

				-----CURRENT STATE-----				
* SPACECRAFT NAME	COUNTRY AND AGENCY	LAUNCH DATE	ORBIT TYPE	* NSSDC ID	EPOCH HHDDYY	STATUS	DATA RATE	PAGE NO.
*PRINC-INVST-NAME	EXPERIMENT NAME							
ALSEP 16	SEE APOLLO 16 LM/ALSEP							
ALSEP 17	SEE APOLLO 17 LM/ALSEP							
AKPS	UNITED STATES NASA-DSS	STUDY	GEOCENTRIC	ANPS		PROPOSED		20
ANS	THE NETHERLANDS NIVR	08/30/74	GEOCENTRIC	74-070A	08/30/74	NORMAL	SUBS	20
BRINKMAN	UNITED STATES NASA-DSS			74-070A-02	08/30/74	NORMAL	SUBS	20
GURSKY	LOW-ENERGY X-RAY EXPERIMENT			74-070A-03	08/30/74	NORMAL	SUBS	20
VANDUINEN	HIGH ANGULAR AND SPECTRAL RESOLUTION OBSERVATIONS OF COSMIC X-RAY SOURCES			74-070A-01	08/30/74	NORMAL	SUBS	21
APOLLO 12 LM/ALSEP	UNITED STATES NASA-DMSF	11/14/69	LUNAR LANDER	69-099C	11/19/69	NORMAL	STD	21
FREEMAN	UNITED STATES NASA-DSS			69-099C-05	03/18/70	NORMAL	SUBS	21
LATHAM	SUPRATHERMAL ION DETECTOR			69-099C-03	11/19/69	PARTIAL	STD	21
SNYDER	PASSIVE SEISMIC			69-099C-02	11/05/71	PARTIAL	STD	21
APOLLO 12C	SEE APOLLO 12 LM/ALSEP							
APOLLO 14 LM/ALSEP	UNITED STATES NASA-DMSF	01/31/71	LUNAR LANDER	71-008C	02/05/71	NORMAL	STD	21
FREEMAN	UNITED STATES NASA-DSS			71-008C-06	03/29/72	PARTIAL	SUBS	22
JOHNSON	SUPRATHERMAL ION DETECTOR			71-008C-07	04/15/73	PARTIAL	SUBS	22
KOVACH	COLD CATHODE ION GAUGE EXPERIMENT			71-008C-05	12/07/73	PARTIAL	SUBS	22
LATHAM	ACTIVE SEISMIC			71-008C-04	03/20/72	PARTIAL	SUBS	22
O'BRIEN	PASSIVE SEISMIC			71-008C-08	06/06/71	PARTIAL	SUBS	22
APOLLO 14C	SEE APOLLO 14 LM/ALSEP							
APOLLO 15 LM/ALSEP	UNITED STATES NASA-DMSF	07/26/71	LUNAR LANDER	71-063C	07/30/71	NORMAL	STD	22
BATES	UNITED STATES NASA-DSS			71-063C-09	07/31/71	NORMAL	STD	23
FREEMAN	LUNAR DUST DETECTOR			71-063C-05	09/13/73	PARTIAL	SUBS	23
JOHNSON	SUPRATHERMAL ION DETECTOR			71-063C-07	02/22/73	PARTIAL	SUBS	23
LANGSETH	COLD CATHODE ION GAUGE EXPERIMENT			71-063C-06	08/07/71	PARTIAL	STD	23
LATHAM	HEAT FLOW			71-063C-01	07/31/71	NORMAL	STD	23
APOLLO 15C	SEE APOLLO 15 LM/ALSEP							
APOLLO 16 LM/ALSEP	UNITED STATES NASA-DMSF	04/16/72	LUNAR LANDER	72-031C	04/21/72	NORMAL	STD	24
DVAL	UNITED STATES NASA-DSS			72-031C-03	08/17/73	NORMAL	STD	24
KOVACH	LUNAR SURFACE MAGNETOMETER			72-031C-02	12/07/73	NORMAL	SUBS	24
LATHAM	ACTIVE SEISMIC			72-031C-01	04/21/72	NORMAL	STD	24
APOLLO 16C	SEE APOLLO 16 LM/ALSEP							
APOLLO 17 LM/ALSEP	UNITED STATES NASA-DMSF	12/07/72	LUNAR LANDER	72-096C	12/11/72	NORMAL	STD	24
BERG	UNITED STATES NASA-DSS			72-096C-05	12/17/72	PARTIAL	SUBS	25
KOVACH	LUNAR EJECTA AND METEORITES			72-096C-06	12/20/72	NORMAL	SUBS	25
LANGSETH	LUNAR SEISMIC PROFILING EXPERIMENT			72-096C-01	12/11/72	NORMAL	STD	25
WEBER	HEAT FLOW			72-096C-09	12/12/72	PARTIAL	SUBS	25
APOLLO 17C	SEE APOLLO 17 LM/ALSEP							
APOLLO-SOYUZ TEST PROJ	SEE ASTP							
ASTP	UNITED STATES NASA-DMSF	07/15/73	GEOCENTRIC	ASTP		APPROVED		25
ANG	U.S.S.R. SAS			ASTP -06				26
BOWYER	INFLUENCE OF WEIGHTLESSNESS ON THE			ASTP -01				26
BOWYER	IMMISCIBILITY OF MONOTECTIC ALLOY SYSTEMS			ASTP -02				26
BUCKER	EXTREME ULTRAVIOLET ASTRONOMY			ASTP -16				26
CRISWELL	HELIUM GLOW			ASTP -14				26
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GATOS	RESPONSE OF MAN			ASTP -08				26
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LARSON	SKY-EARTH X-RAY OBSERVATIONS			ASTP -07				27
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REED	ELECTRONIC MATERIALS PROCESSING			ASTP -05				27
TAYLOR	ELECTROPHORESIS			ASTP -15				27
TOBIAS	ROLE OF CONVECTION IN SOLIDIFICATION			ASTP -17				27
WEIFFENBACH	PROCESS IN HIGH COERCIVE STRAIGHT MAGNET			ASTP -12				27
WIEDEMAYER	POLYMORPHONUCLEAR LEUKOCYTE RESPONSE TO			ASTP -09				27
YUE	INFECTION			ASTP -10				27
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ATMOSPHERE EXPLORER-C	SEE AE-C								
ATMOSPHERE EXPLORER-D	SEE AE-D								
ATMOSPHERE EXPLORER-E	SEE AE-E								
ATS 5	UNITED STATES	NASA-GA	08/12/69	GEOCENTRIC	69-069A	06/01/73	PARTIAL	SUBS	28
MCILWAIN	OMNIDIRECTIONAL HIGH-ENERGY PARTICLE DETECTOR				69-069A-03	08/00/72	NORMAL	SUBS	28
MCILWAIN	BIDIRECTIONAL LOW-ENERGY PARTICLE DETECTOR				69-069A-11	08/00/73	PARTIAL	SUBS	28
SUGIURA	MAGNETIC FIELD MONITOR				69-069A-13	06/10/73	PARTIAL	SUBS	29
ATS 6	UNITED STATES	NASA-GA	05/30/74	GEOCENTRIC	74-039A	05/30/74	NORMAL	STD	29
COLEMAN, JR.	MAGNETOMETER EXPERIMENT				74-039A-02	05/30/74	NORMAL	STD	29
DAVIES	RADIO BEACON				74-039A-09	10/01/74	NORMAL	STD	29
FRITZ	MEASUREMENT OF LOW-ENERGY PROTONS				74-039A-01	06/10/74	NORMAL	STD	29
HASLEY	SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION				74-039A-06	06/14/74	NORMAL	STD	29
MCILWAIN	AURORAL PARTICLES EXPERIMENT				74-039A-05	06/15/74	NORMAL	STD	30
PAULIKAS	OMNIDIRECTIONAL SPECTROMETER				74-039A-07	06/14/74	NORMAL	STD	30
WINCKLER	PARTICLE ACCELERATION MECHANISMS AND DYNAMICS OF THE OUTER TRAPPING REGION				74-039A-04	06/14/74	NORMAL	STD	30
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ATS-F	SEE ATS 6								
AUTO-LUNAR POLAR ORBITER	SEE LUNAR POLAR ORB-DAUGHTER								
AUTO-LUNAR POLAR ORBITER	SEE LUNAR POLAR ORB-MOTHER								
CANADIAN TECHNOLOGY SAT.	SEE CAS-C								
CAS-C	CANADA	CRC	4 QTR 75	GEOCENTRIC	CAS-C		APPROVED		30
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COOPERATIVE APPLICA SAT.	SEE CAS-C								
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CORSA	JAPAN	TOKYO U	4 QTR 75	GEOCENTRIC	CORSA		PROPOSED		30
HAYAKAWA	COSMIC X-RAY DETECTION (0.35 - 60 KEV)				CORSA -01				30
ODA	COSMIC HEAVY PRIMARY PARTICLES				CORSA -02				31
COS-B	INTERNATIONAL	ESRO	3 QTR 75	GEOCENTRIC	COS-B		APPROVED		31
COSMIC RAY SATELLITE	SEE CORSA								
COSMIC RAY SATELLITE-B	SEE COS-B								
CYS	SEE CAS-C								
DAD	SEE DADE-A								
DAD	SEE DADE-B								
DADE-A	UNITED STATES	NASA-055	2HALF 75	GEOCENTRIC	DADE-A		APPROVED		31
KEATING	ATMOSPHERIC DRAG DENSITY				DADE-A -01				31
NIER	ATMOSPHERIC COMPOSITION MASS SPECTROMETER				DADE-A -02				31
DADE-B	UNITED STATES	NASA-055	2HALF 75	GEOCENTRIC	DADE-B		APPROVED		31
KEATING	ATMOSPHERIC DRAG DENSITY				DADE-B -01				31
NIER	ATMOSPHERIC COMPOSITION MASS SPECTROMETER				DADE-B -02				32
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EARTH RES TECH SAT.-A	SEE ERTS 1								
EARTH RES TECH SAT.-B	SEE ERTS-B								
EOS-A	UNITED STATES	NASA-GA	1979	GEOCENTRIC	EOS-A		PROPOSED		32
ERS 26	SEE OVS-6								
ERTS 1	UNITED STATES	NASA-GA	07/23/72	GEOCENTRIC	72-058A	07/23/72	NORMAL	STD	32
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PAINTER	DATA COLLECTION SYSTEM (DCS)				72-058A-03	07/23/72	NORMAL	STD	33
ERTS-A	SEE ERTS 1								
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ARLUSKAS	MULTISPECTRAL SCANNER (MSS)			ERTS-B -02				34
PAINTER	DATA COLLECTION SYSTEM (DCS)			ERTS-B -03				34
WEINSTEIN	RETURN BEAM VIDICON (RBV) CAMERA SYSTEM			ERTS-B -01				34
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ESRO GEOS	INTERNATIONAL	ESRO	2 OCT 76	GEOCENTRIC		APPROVED		34
BOYD	THERMAL PLASMA FLOW			ESGEO -02				34
GEISS	LOW-ENERGY ION COMPOSITION			ESGEO -03				35
GENDRIN	ELECTROMAGNETIC WAVE FIELDS			ESGEO -06				35
HULTQUIST	LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION			ESGEO -04				35
MARIANI	TRIAXIAL FLUXGATE MAGNETOMETER			ESGEO -09				35
MELZNER	DC ELECTRIC FIELD AND GRADIENT & ELECTRON BEAM DEFLECTION			ESGEO -08				35
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PFOTZER	ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION			ESGEO -01				35
ESSA B	UNITED STATES	ESSA	12/15/68	GEOCENTRIC	AB-114A	12/15/68	NORMAL	STD
NESS STAFF	AUTOMATIC PICTURE TRANSMISSION (APT) SYSTEM			68-114A-01	03/00/69	PARTIAL	SUBS	36
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EXOS-A	JAPAN	TOKYO U	00/00/77	GEOCENTRIC	EXOS-A		APPROVED	36
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UNKNOWN	X-RAY AND ULTRAVIOLET AURORAL TELESCOPES			EXOS-A -03				36
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EXOS-B	JAPAN	TOKYO U	00/00/78	GEOCENTRIC	EXOS-B		APPROVED	37
UNKNOWN	MAGNETOSPHERIC PLASMA PROBE			EXOS-B -01				37
UNKNOWN	ENERGETIC PARTICLE DETECTORS			EXOS-B -02				37
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UNKNOWN	X-RAY AND GAMMA-RAY ASTRONOMICAL TELESCOPES			EXOS-C -01				37
UNKNOWN	ULTRAVIOLET TELESCOPE			EXOS-C -02				37
UNKNOWN	INFRARED TELESCOPE			EXOS-C -03				37
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EXPLORER 19	SEE AD-A							
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GMS	JAPAN	NASDA	01/00/77	GEOCENTRIC	GMS		APPROVED	39
	JAPAN	JMA						
GOES-A	SEE SMS-C							

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

KMF 12/10/74 HELIC .C
 USA-055
 TOR AND ANALYZER
 RE TIME RESOLUTION
 SE TIME RESOLUTION
 WAVE
 DETECTOR
 METER
 R FOP AG. -LDS
 R F -LD

LAUNCHED SUCCESSFULLY
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TRAINOR		GALACTIC AND SOLAR COSMIC RAYS			HELIO-D-08				49
HELOS	UNKNOWN	INTERNATIONAL	ESRO 08/00/79	GEOCENTRIC	HELOS		PROPOSED		49
UNKNOWN		MEDIUM-ENERGY COSMIC X-RAY PACKAGE			HELOS -01				49
UNKNOWN		LOW-ENERGY COSMIC X-RAY PACKAGE			HELOS -02				50
HEOS 1	ELLIOT	INTERNATIONAL	ESRO 12/05/68	GEOCENTRIC	68-109A	05/00/72	PARTIAL	SUBS	50
		INTERPLANETARY MAGNETIC FIELDS			68-109A-02	05/00/72	NORMAL	SUBS	50
HEOS-A		SEE HEOS 1							
HEOS-A1		SEE HEOS 1							
HI-ECCEN LUN OCCULT.SAT.		SEE HELOS							
IME-D		SEE ISEE-B							
IME-H		SEE ISEE-C							
IME-M		SEE ISEE-A							
IMP 6		SEE IMP-I							
IMP 7		SEE IMP-H							
IMP 8		SEE IMP-J							
IMP-H		UNITED STATES	NASA-OSS 09/23/72	GEOCENTRIC	72-073A	09/23/72	NORMAL	STD	50
BAKE		MEASUREMENT OF SOLAR PLASMA			72-073A-10	09/23/72	NORMAL	STD	50
BRIDGE		MEASUREMENT OF SOLAR PLASMA			72-073A-02	12/11/73	PARTIAL	STD	50
CLINE		STUDY OF COSMIC-RAY, SOLAR, AND			72-073A-13	10/13/72	NORMAL	STD	51
FRANK		MAGNETOSPHERIC ELECTRONS			72-073A-04	09/23/72	NORMAL	STD	51
GLOECKLER		MEASUREMENT OF LOW-ENERGY PROTONS AND			72-073A-03	11/25/72	PARTIAL	STD	51
		ELECTRONS			72-073A-08	12/11/73	PARTIAL	STD	51
KRIMIGIS		IONS AND ELECTRONS IN THE ENERGY RANGE			72-073A-09	09/26/72	NORMAL	STD	51
MCDONALD		0.1 TO 2 MEV			72-073A-12	09/24/72	NORMAL	STD	51
OGILVIE		CHARGED PARTICLE MEASUREMENTS EXPERIMENT			72-073A-11	09/24/72	NORMAL	SUBS	52
SCARF		SOLAR AND COSMIC-RAY PARTICLES			72-073A-07	09/23/72	NORMAL	STD	52
SIMPSON		SOLAR WIND ION COMPOSITION			72-073A-06	09/23/72	NORMAL	STD	52
STONE		PLASMA WAVE EXPERIMENT			72-073A-05	09/26/72	NORMAL	STD	52
WILLIAMS		SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z			72-073A-04	09/23/72	NORMAL	STD	52
		ISOTOPE EXPERIMENT			72-073A-06	09/23/72	NORMAL	STD	52
		ELECTRONS AND HYDROGEN AND HELIUM			72-073A-05	09/26/72	NORMAL	STD	52
		ISOTOPE			72-073A-05	09/26/72	NORMAL	STD	52
		ENERGETIC ELECTRONS AND PROTONS			72-073A-05	09/26/72	NORMAL	STD	52
IMP-I		UNITED STATES	NASA-OSS 03/13/71	GEOCENTRIC	71-019A	10/02/74	INOPERABLE	ZERO	52
AGGSON		ELECTROSTATIC FIELDS			71-019A-02	10/02/74	INOPERABLE	ZERO	53
ANDERSON		MEDIUM-ENERGY SOLAR PROTONS AND			71-019A-06	10/02/74	INOPERABLE	ZERO	53
		ELECTRONS			71-019A-11	10/02/74	INOPERABLE	ZERO	53
BAKE		MEASUREMENT OF SOLAR PLASMA			71-019A-07	10/02/74	INOPERABLE	ZERO	53
BOSTROM		MONITORING OF SOLAR PROTONS			71-019A-05	10/02/74	INOPERABLE	ZERO	53
FRANK		LOW-ENERGY PROTONS AND ELECTRONS			71-019A-03	10/02/74	INOPERABLE	ZERO	54
GURNETT		ELECTROSTATIC WAVES AND RADIO			71-019A-16	10/02/74	INOPERABLE	ZERO	54
		NOISE -- IOWA			71-019A-13	10/02/74	INOPERABLE	ZERO	54
GURNETT		ELECTROSTATIC WAVES AND RADIO			71-019A-12	10/02/74	INOPERABLE	ZERO	54
		NOISE -- GSFC			71-019A-08	10/02/74	INOPERABLE	ZERO	54
HADDOCK		INTERPLANETARY LONG-WAVELENGTH			71-019A-01	10/02/74	INOPERABLE	ZERO	54
KELLOGG		ASTRONOMY EXPERIMENT			71-019A-09	10/02/74	INOPERABLE	ZERO	55
		ELECTROSTATIC WAVES AND			71-019A-01	10/02/74	INOPERABLE	ZERO	54
		NOISE -- MINN			71-019A-09	10/02/74	INOPERABLE	ZERO	55
MCDONALD		SOLAR AND GALACTIC X-RAY JONES			71-019A-01	10/02/74	INOPERABLE	ZERO	54
NESS		MEASUREMENT OF MAGNETIC FIELDS			71-019A-09	10/02/74	INOPERABLE	ZERO	55
SIMPSON		NUCLEAR COMPOSITION COSMIC AND SOLAR			71-019A-09	10/02/74	INOPERABLE	ZERO	55
		PARTICLE RADIATION			71-019A-09	10/02/74	INOPERABLE	ZERO	55
IMP-J		UNITED STATES	NASA-OSS 10/26/73	GEOCENTRIC	73-078A	10/26/73	NORMAL	STD	55
AGGSON		ELECTROSTATIC FIELDS			73-078A-11	10/26/73	NORMAL	STD	55
BAKE		MEASUREMENT OF SOLAR PLASMA			73-078A-10	10/26/73	NORMAL	STD	55
BRIDGE		MEASUREMENT OF SOLAR PLASMA			73-078A-02	10/26/73	NORMAL	STD	55
FRANK		MEASUREMENT OF LOW-ENERGY PROTONS AND			73-078A-04	10/26/73	NORMAL	STD	55
		ELECTRONS			73-078A-03	10/26/73	NORMAL	STD	56
GLOECKLER		SOLID-STATE DETECTORS			73-078A-12	10/26/73	NORMAL	STD	56
GURNETT		ELECTROSTATIC WAVES AND RADIO NOISE			73-078A-08	04/00/74	PARTIAL	STD	56
KRIMIGIS		CHARGED PARTICLE MEASUREMENTS			73-078A-09	10/26/73	NORMAL	STD	56
		EXPERIMENT			73-078A-01	10/26/73	NORMAL	STD	56
MCDONALD		SOLAR AND COSMIC-RAY PARTICLES			73-078A-07	10/26/73	NORMAL	STD	57
NESS		MAGNETIC FIELD EXPERIMENT			73-078A-06	10/26/73	NORMAL	STD	57
SIMPSON		SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z			73-078A-05	10/26/73	NORMAL	STD	57
		EXPERIMENTS			73-078A-05	10/26/73	NORMAL	STD	57
STONE		ELECTRONS AND HYDROGEN AND HELIUM			73-078A-05	10/26/73	NORMAL	STD	57
		ISOTOPE			73-078A-05	10/26/73	NORMAL	STD	57
WILLIAMS		ENERGETIC ELECTRONS AND PROTONS			73-078A-05	10/26/73	NORMAL	STD	57
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INDIAN SCIENTIFIC SAT.		INDIA	ISRO 12/00/74	GEOCENTRIC	INDASAT		APPROVED		57
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INT ULTRAVIOLET EXPL	SEE IUE							
INTA SATELLITE	SEE INTASAT							
INTASAT	SPAIN UNITED STATES IONOSPHERIC		GEOCENTRIC	INTASAT		APPROVED		57
UNKNOWN				INTASAT-01				58
INTERCOSMOS 10	U.S.S.R.	10/30/73	GEOCENTRIC	73-082A	10/30/73	NORMAL	UNKN	58
UNKNOWN	MAGNETIC FIELD MEASUREMENT			73-082A-01	10/30/73	NORMAL	UNKN	58
UNKNOWN	ELECTRIC FIELD MEASUREMENT			73-082A-02	10/30/73	NORMAL	UNKN	58
UNKNOWN	LOW-ENERGY PARTICLES			73-082A-03	10/30/73	NORMAL	UNKN	58
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BRIDGE	TWO-FREQUENCY RADIO RECEIVER			65-105A-04	02/07/71	NORMAL	SUBS	96
ESHELEMAN	COSMIC-RAY TELESCOPE			65-105A-03	07/30/72	PARTIAL	SUBS	96
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3.2 INVESTIGATOR NAME INDEX

The following index lists (in alphabetical order) the names of the principal investigators or team leaders and the other investigators or team members associated with each experiment described in section 2 (Descriptions of Active and Planned Spacecraft and Experiments) of this report. The current organizational affiliation of the person is also shown. Listed under each person's name are the associated experiment entries. Each experiment entry contains the spacecraft and experiment name, NSSDC ID code, and the page number on which the experiment is described in this document. An asterisk that precedes an experiment name identifies the person associated with that experiment as the principal investigator or team leader.

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AEROS 2, ELECTRON CONCENTRATION IN THE IONOSPHERE (74-055A-03).....		18
AEROS 2, FLUX AND SPECTRAL DISTRIBUTION OF SOLAR EUV RAD AND THEIR TEMP AND SPATIAL VAR (74-055A-04).....		18
PIONEER VENUS ORBITER, RETARDING POTENTIAL ANALYZER (PIQ7ROR-17).....		100
WOLF RES + DEV CORP		
SOLRAD 10, SOLAR RADIATION DETECTORS (71-058A-01).....		126
VALE U		
AE-D, AIRGLOW PHOTOMETER (AE-D -13).....		12
AE-C, AIRGLOW PHOTOMETER (AE-E -11).....		16
APOLLO 15 LM/ALSEP, HEAT FLOW (71-063C-06).....		23
APOLLO 17 LM/ALSEP, HEAT FLOW (72-066C-01).....		26
YORK U		
AE-C, AIRGLOW PHOTOMETER (73-101A-14).....		9
AE-D, AIRGLOW PHOTOMETER (AE-D -13).....		12
AE-E, AIRGLOW PHOTOMETER (AE-E -11).....		16
ISIS 2, 6700-A PHOTOMETER (71-024A-12).....		69

3.4 PHENOMENON MEASURED INDEXES

The Phenomenon Measured Indexes consist of (1) bar graphs showing the operational history of particles and fields and electromagnetic radiation experiments and (2) listings of experiments by phenomenon measured. Both of these index displays were produced with the aid of an NSSDC automated set of experiment-level phenomenon measured keywords. The search and retrieval capability made possible by these keywords is available to the space science community, and a brief description of the keyword scheme follows. Detailed descriptions of the format and content of the two index displays precede each index.

Keywords are assigned to a maximum of 10 separate modes of operation for each satellite experiment. These keywords (identified in the following paragraphs) describe what is measured by a given experiment mode, where the measurement is made (or for remote sensors, what objects are sensed), when the measurement is made, and the numerical ranges for a maximum of four characteristics of the measurement (e.g., particle energy).

What: A given experiment mode is considered to measure one of five basically different phenomena: (1) electromagnetic fields, (2) charged particles, (3) microscopic neutral particles, (4) macroscopic bodies, and (5) "other."

- (1) Electromagnetic fields: In this category, electric fields, magnetic fields, and electromagnetic radiation are separately identifiable. For electric and magnetic fields, the number of orthogonal components measured is specifiable; while for electromagnetic radiation (waves), the type (gamma rays through radio waves) and numerical frequency range of the measurement can be specified.
- (2) Charged particles: For charged particles, species (e.g., protons, electrons) and an indication of the extent of species resolution can be specified. An indicator of spectral resolution, the numerical energy and nuclear charge ranges, and flux directionality characteristics can all be specified.
- (3) Microscopic neutral particles: Microscopic neutral particles may be molecules, atoms, or neutrons considered separately or particles considered collectively. Mass range and species resolution are specifiable, as is the measurement technique (e.g., imagery, density, and mass spectrometry).

- (4) Macroscopic bodies: These keywords identify the body and the measurement technique (e.g., imagery, seismic technique).
- (5) Other: These keywords indicate whether the experiment is related to one of six categories: communications, engineering/technology, life sciences, material sciences, navigation, and other.

Where: For the Earth's vicinity, space is subdivided as follows:

- (1) Earth and its lower atmosphere
- (2) Altitude between 65 and 3000 km - in this range, space is categorized into three separate latitude intervals:
 - (a) equatorial, $< 40^\circ$ latitude
 - (b) midlatitude, 40° to 65° latitude
 - (c) high latitude, $> 65^\circ$ latitude
- (3) The magnetosphere above 3000 km is further divided into six regions:
 - (a) $L < 2 R_E$
 - (b) $2R_E < L < 6R_E$
 - (c) $6R_E < L < 10R_E$
 - (d) high polar ($L > 10 R_E$, $R < 10 R_E$)
 - (e) magnetotail ($L > 10 R_E$, $R > 10 R_E$, nightside)
 - (f) dayside magnetosheath and its boundaries

Interplanetary space is subdivided into cislunar and distant regions.

Major macroscopic bodies (Sun, Moon, individual planets) are specifiable as the location of measurements or as the source of remotely sensed electromagnetic radiation.

When: In describing when data are obtained in individual experiment modes, a series of up to five dates may be specified for a given experiment. Then for each of the four time intervals thus defined, the extent of data usefulness (nominal, less than nominal, useless) is specified for each mode.

This discussion of the experiment keyword scheme has been brief, but most of the capabilities have been mentioned. Further information regarding the capabilities and use of this system is available from NSSDC.

3.4.1 Phenomenon Ordered Bar Graphs of Experiment Operational History

<u>Title</u>	<u>Page</u>
Group 1 - Charged Particles - Near-Earth (65 to 3000 km Altitude)	227
Group 2 - Charged Particles - Magnetosphere (Above 3000 km Altitude, including Magnetosheath and Magnetotail)	229
Group 3 - Charged Particles - Interplanetary	235
Group 4 - Magnetic Fields - Near-Earth - Magnetosphere	243
Group 5 - Magnetic Fields - Interplanetary	244
Group 6 - Electric Fields	245
Group 7 - Solar Broadband Electromagnetic Radiation ..	246
Group 8 - Astronomical Broadband Electromagnetic Radiation	247
Group 9 - Electromagnetic Spectral Measurements	248

The operational history for charged particle and field and electromagnetic radiation experiments appearing in section 2 (Descriptions of Active and Planned Spacecraft and Experiments) of this report is indexed by means of a series of bar graphs generated using the NSSDC automated file and the Stromberg-Datagraphix 4060 plotter. The plots allow the user to determine quickly which experiments are active or planned in a given energy range and/or in a given time interval. The plots also indicate the operational status of the experiments as a function of time.

A title at the top of each plot indicates the type of observation made and the region of observation indexed. For charged particle plots, the threshold energy (eV/nucleon) of the energy channel of observation of an experiment is plotted as a function of the experiment operational history (years). The operational history of an active experiment is indicated by using solid-line segments for periods of normal operation, broken-line segments for periods when the operational performance was partial, and dotted-line segments when the experiment was inoperable or at least placed in an operational off mode. A short vertical tick mark below the line indicates when a status change occurred. A given experiment may measure one or more particle species over one or more energy channels. More detailed operational information appears in the appropriate brief description in this report. The planned spacecraft experiments have been arbitrarily assigned an estimated operational period of 2 years. Note that the threshold energy scale may be distorted to accommodate the information

plotted. The energy tick marks are merely approximate indicators of threshold energy. A vertical broken line bisects each bar graph at the date the graph was generated to emphasize the distinction between active and planned experiments.

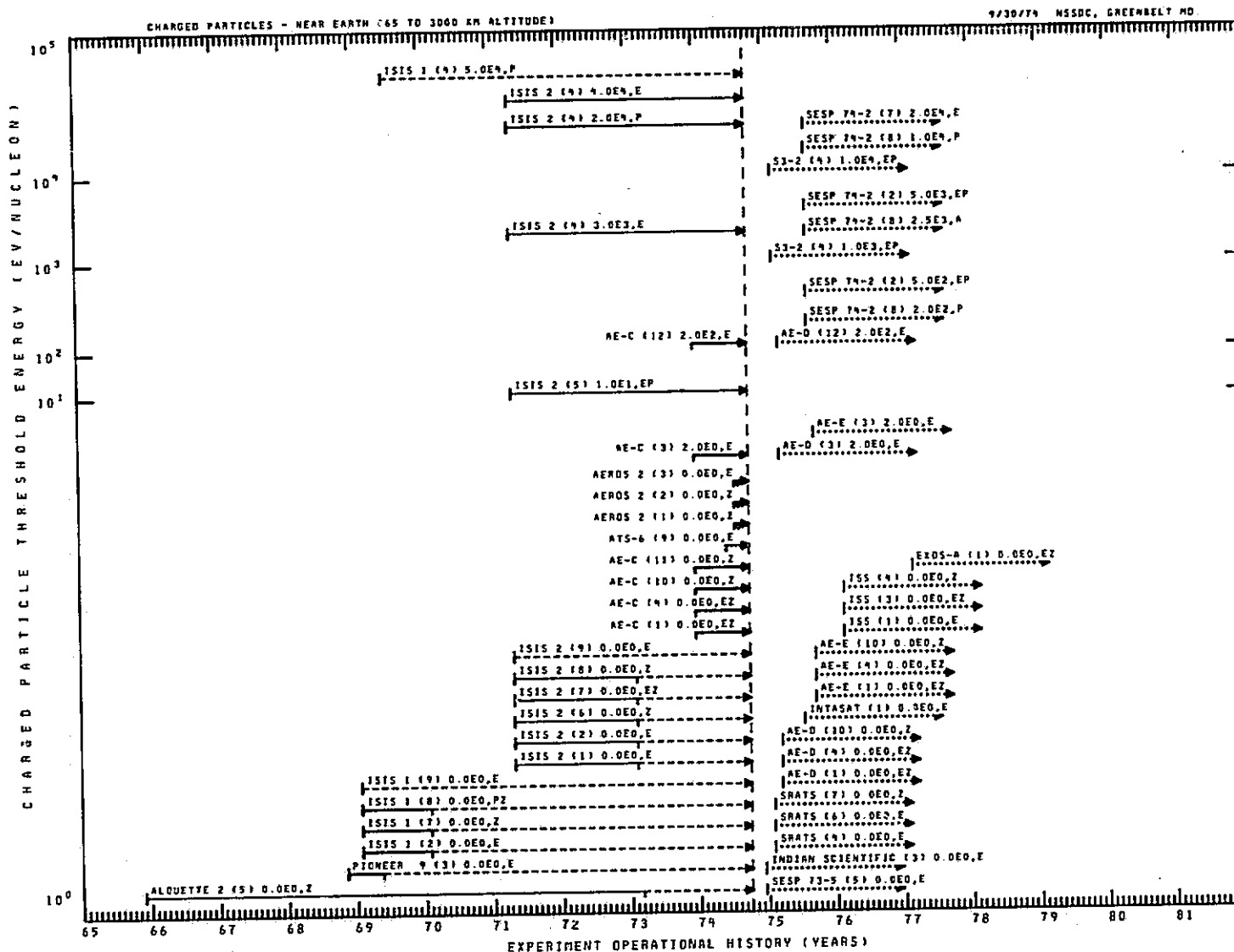
The caption above each plotted time period for the threshold energy channel of a given charged particle experiment shows the spacecraft common name, the experiment number in parentheses, the energy threshold of the energy channel in FORTRAN E format; e.g., 200. = 2.0E2, and the species measured. The following code is used to describe the species measured:

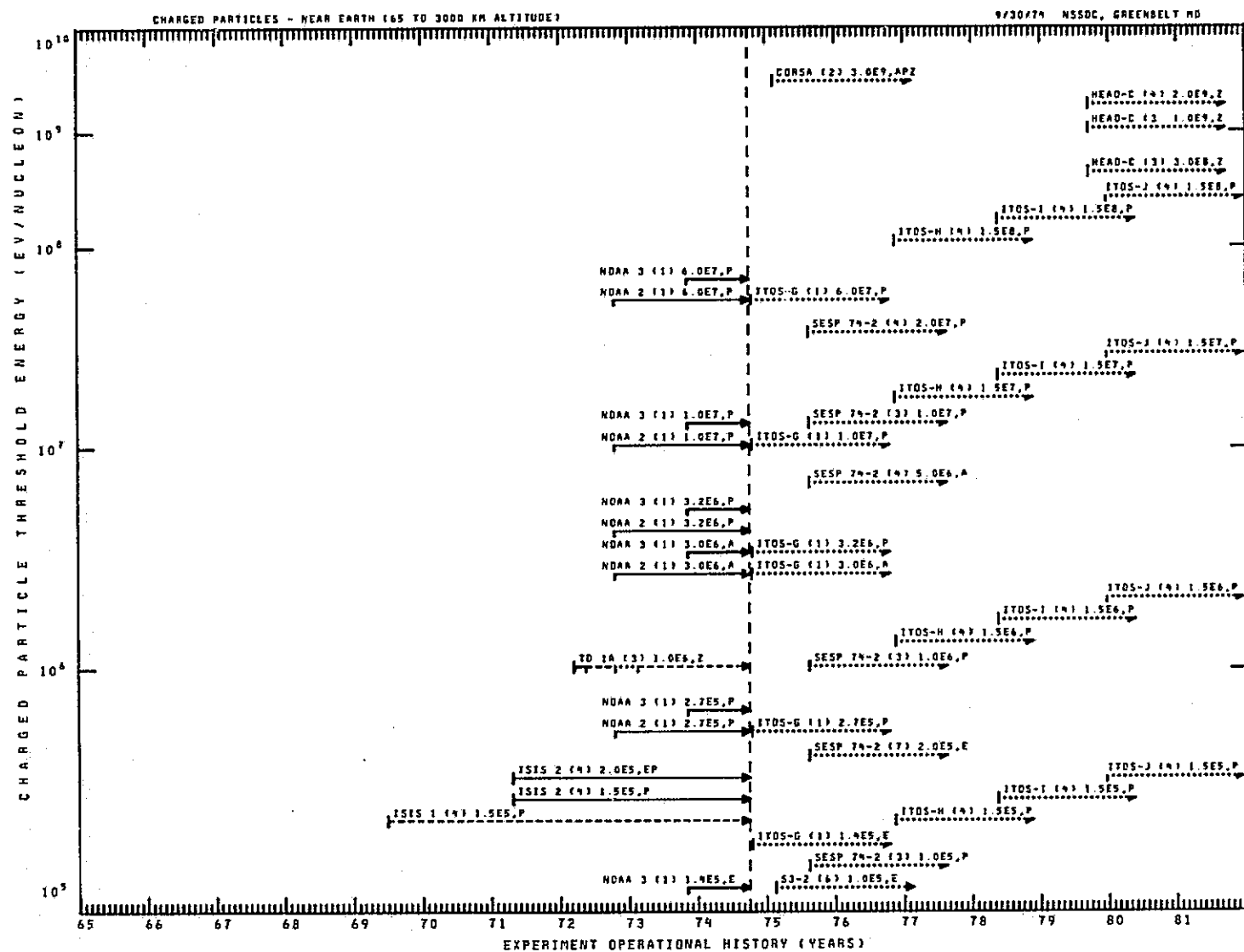
A = Alpha particle
E = Electron
P = Proton
Z = Other particles including deuterons, tritons, positrons,
Z = 2 nuclei (not alpha particles), particles with $Z > 2$,
and ions

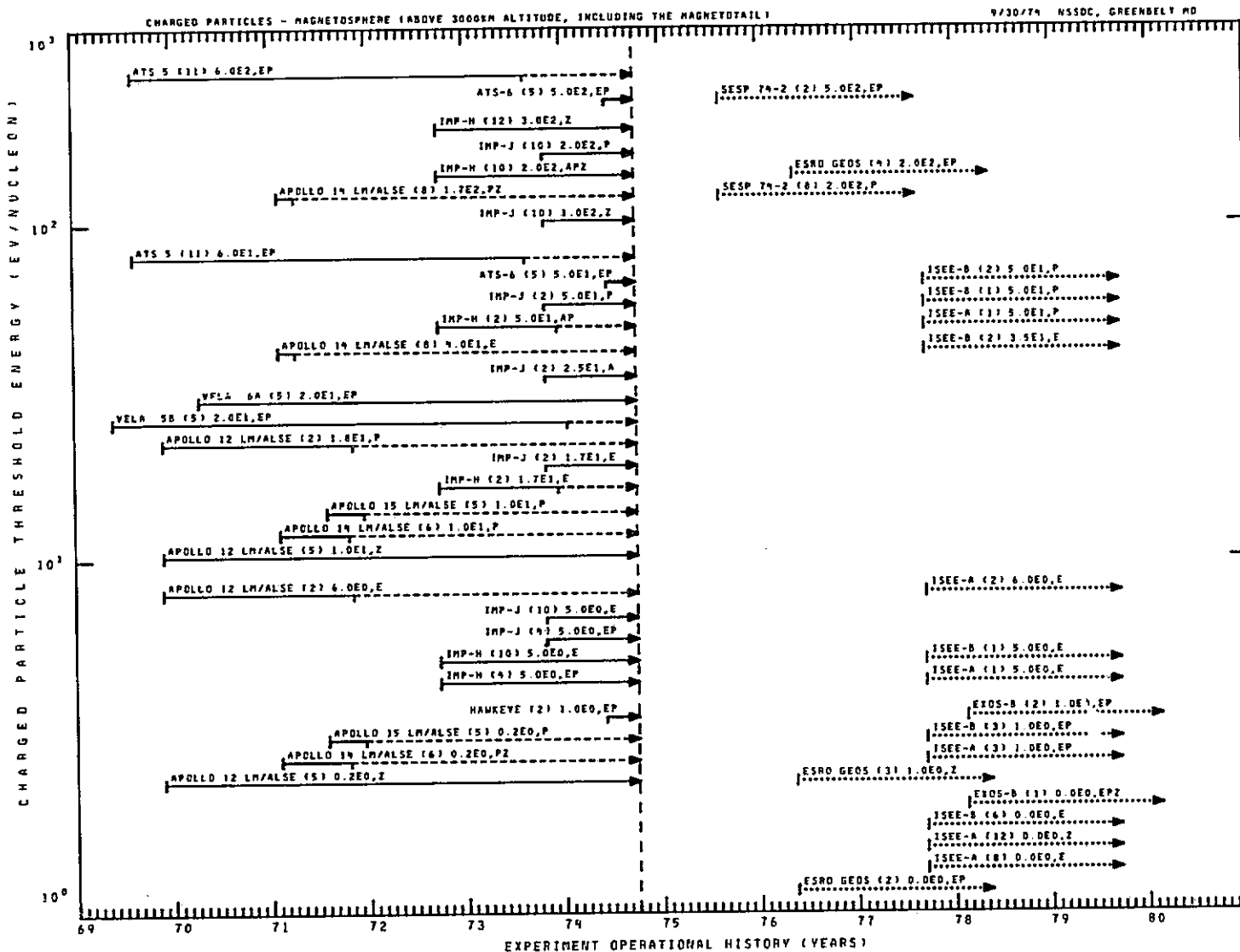
For example, the caption "PIONEER 11 (2) 6.0E7, P" means that spacecraft Pioneer 11, experiment number 2, contains a proton energy channel with a threshold of 60 MeV/nucleon. Such an entry would be referenced in the Index of Active and Planned Spacecraft and Experiments, section 3.1 of this report, and would provide the spacecraft NSSDC ID code 73-019A; therefore, the experiment would have NSSDC ID code 73-019A-02.

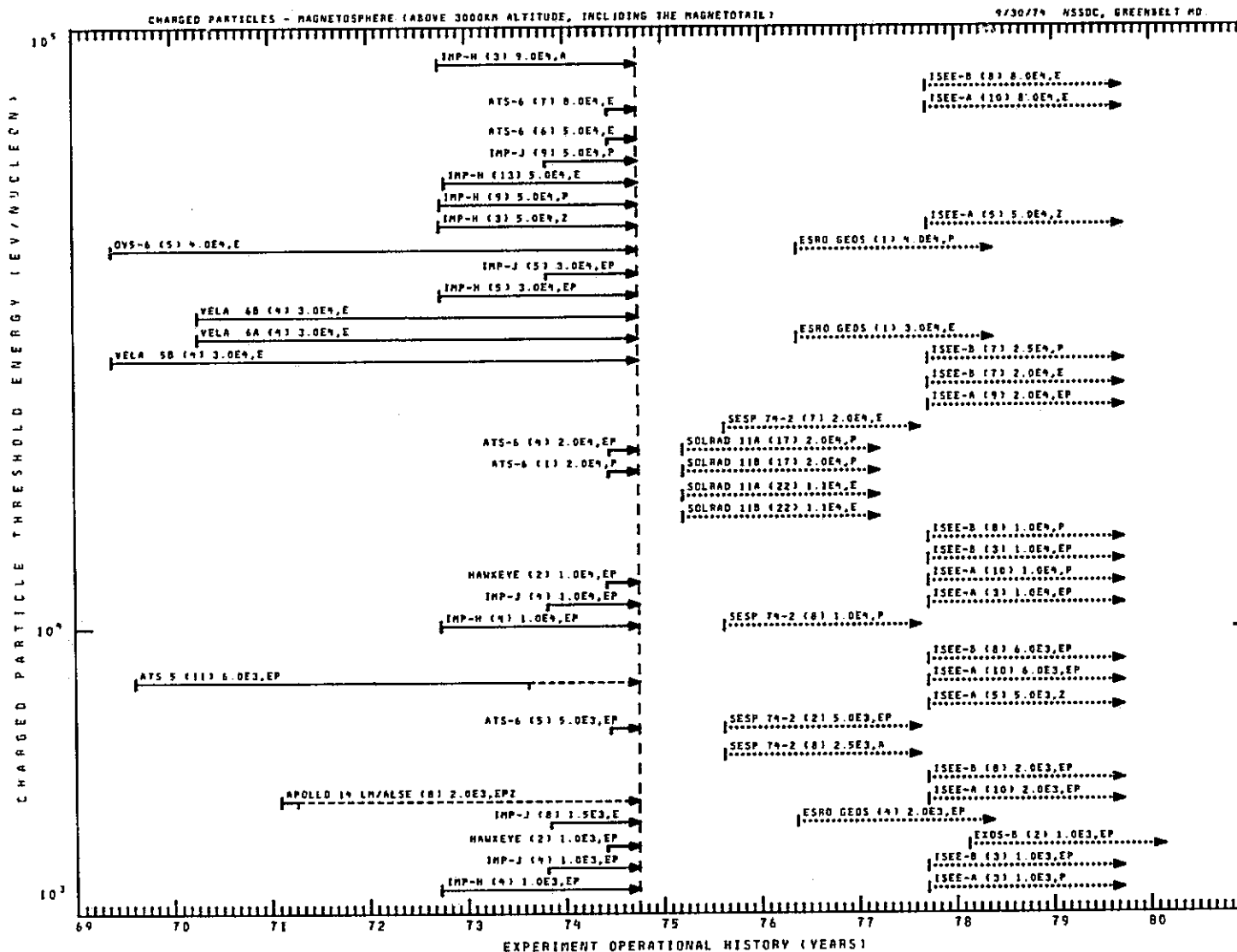
No attempt is made in this index to distinguish between directional and omnidirectional observations or to present the upper bound of the energy measurement. The appropriate brief description includes this information. Note that some experiment energy thresholds may not appear in the graphs because of the manner in which the energy ranges were keyworded in the NSSDC automated file. Note also that some thermal energy long-baseline electron measurements (e.g., experiment number 3 on Pioneers 8 and 9) may appear under "Near-Earth" as well as "Inter-planetary" because of assumptions made in analyzing the data.

The experiment operational history of active and planned magnetic and electric field experiments is displayed on indexing plots similar to those of the charged particles, except that the experiments are ordered alphabetically by spacecraft common name along the vertical axis. Also, the caption above each plotted time period for a given experiment indicates only the spacecraft common name and experiment number. Note that the magnetic field plots include VLF experiments that measure the magnetic field component of electromagnetic radiation. Similarly, for the electric field plot, VLF experiments are included that measure the electric field component of electromagnetic radiation. The ordering of the electromagnetic radiation plots is by the upper wavelength limit of the spectral region covered. Broadband and spectral measurements are those for which $\lambda/\Delta\lambda < 10$ and $\lambda/\Delta\lambda > 10$, respectively.

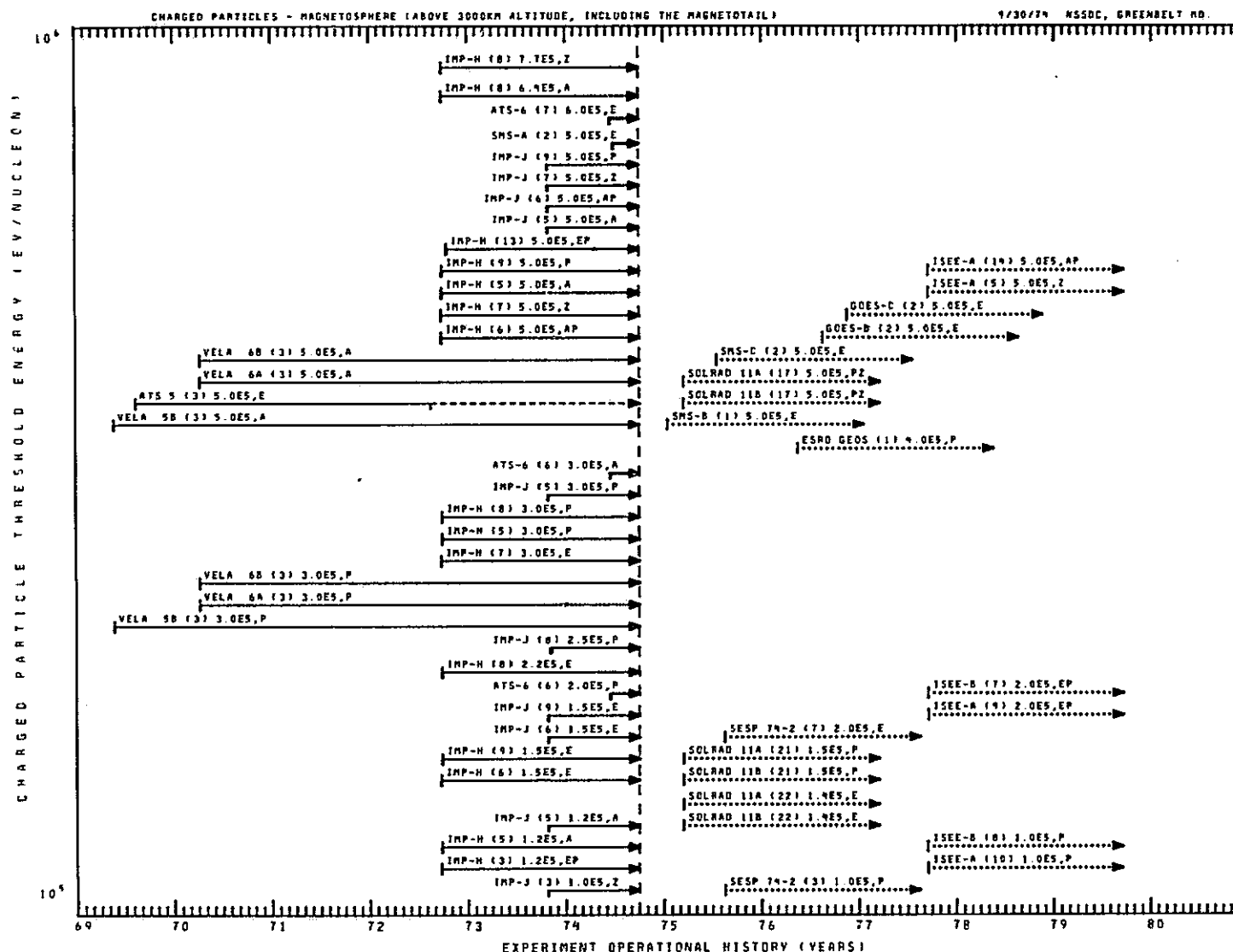


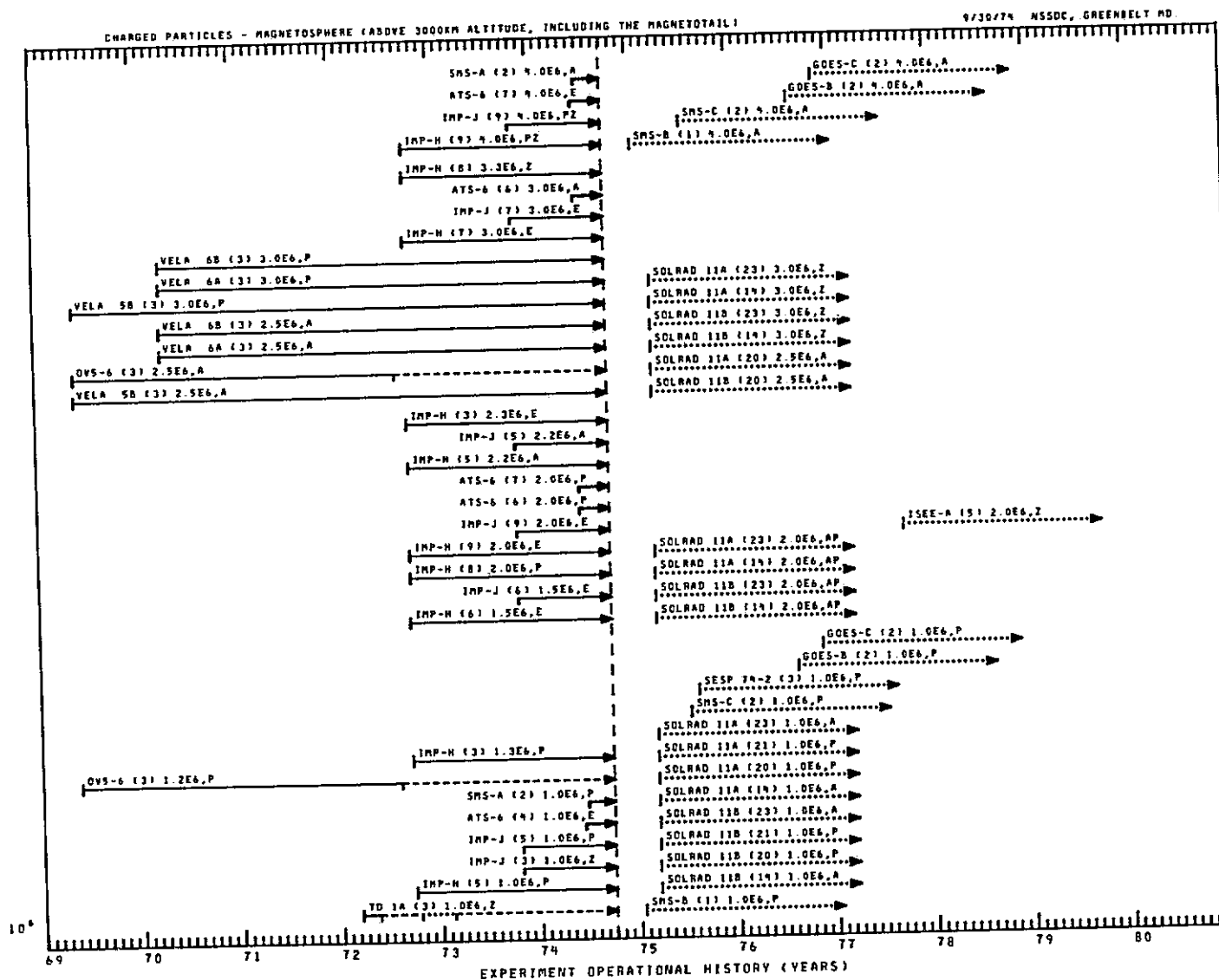




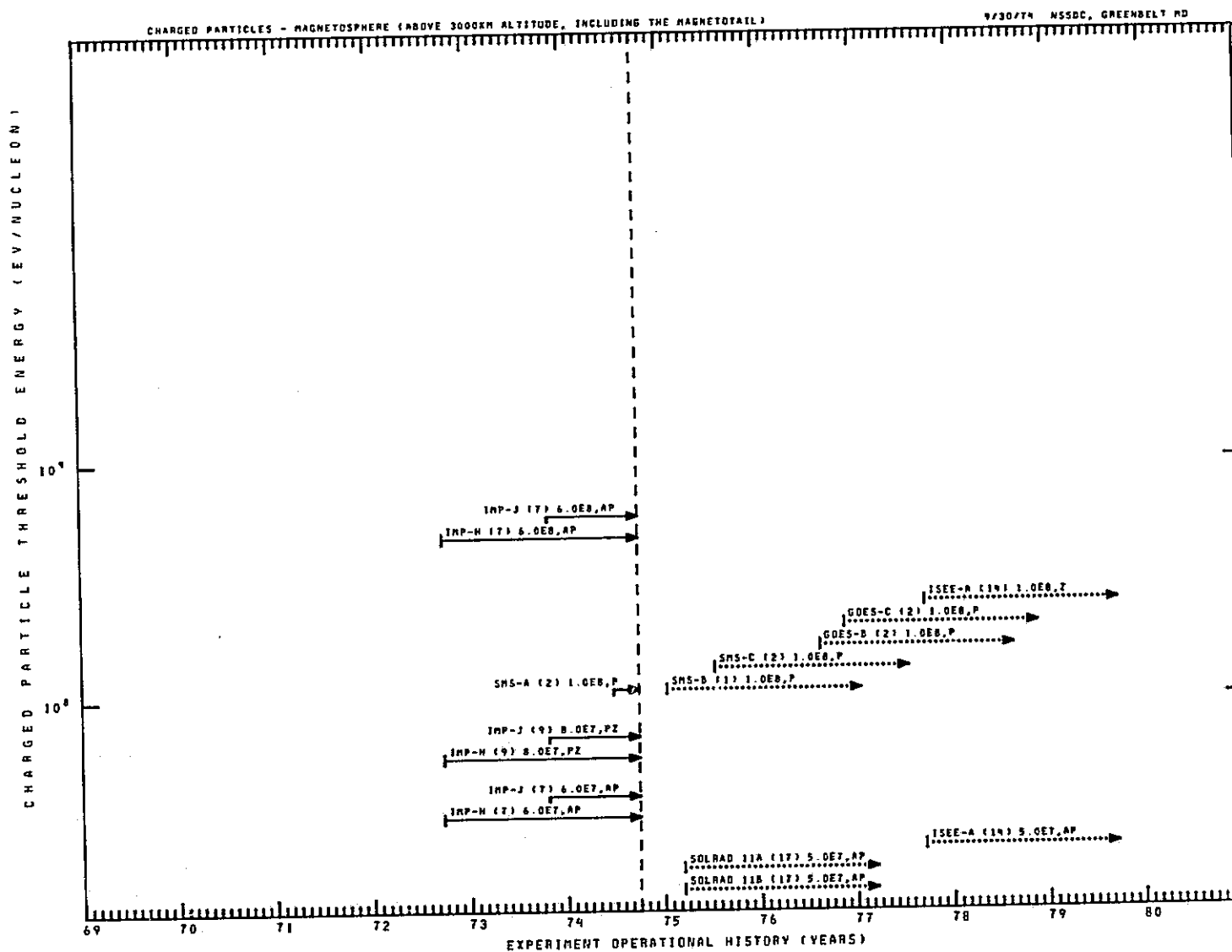


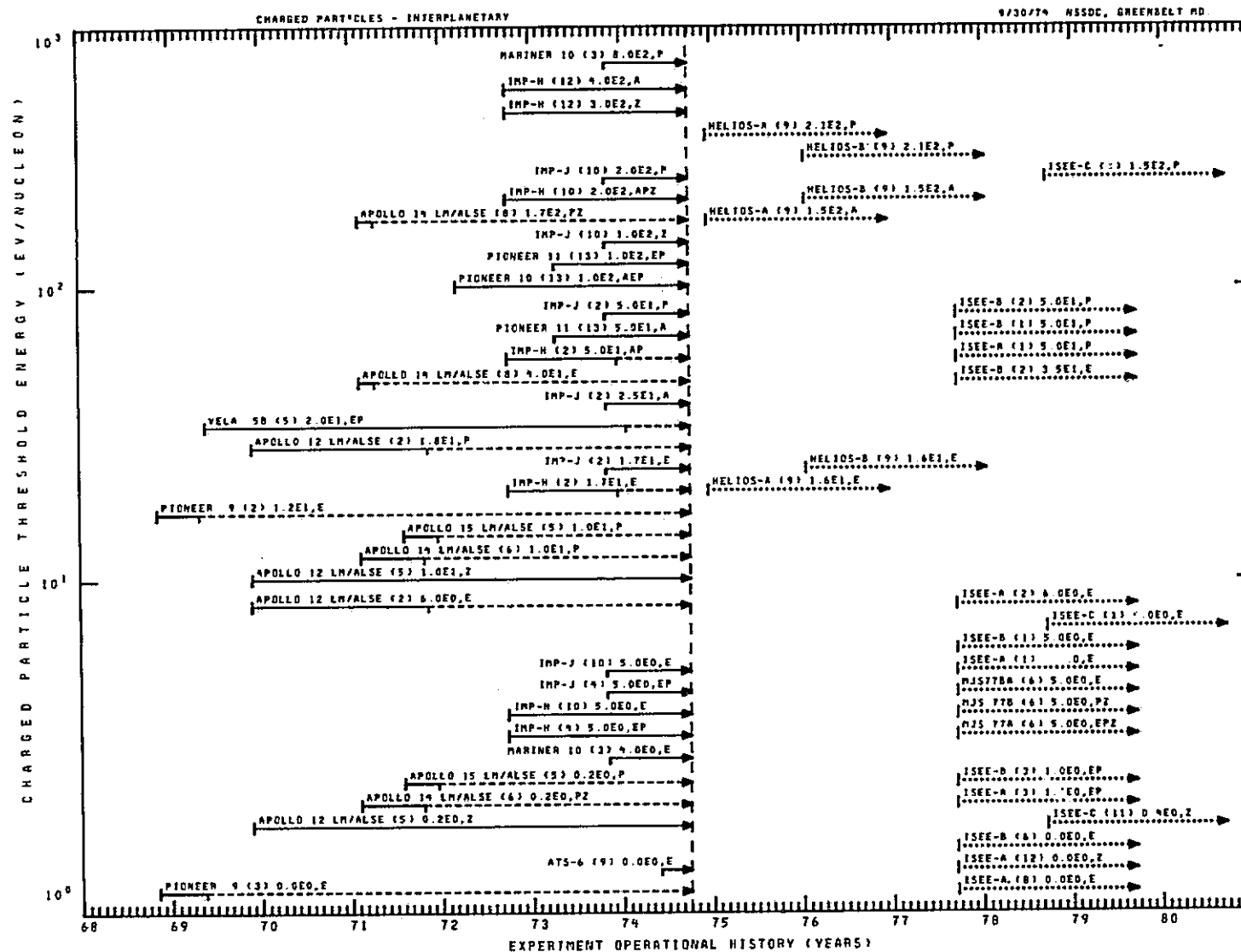
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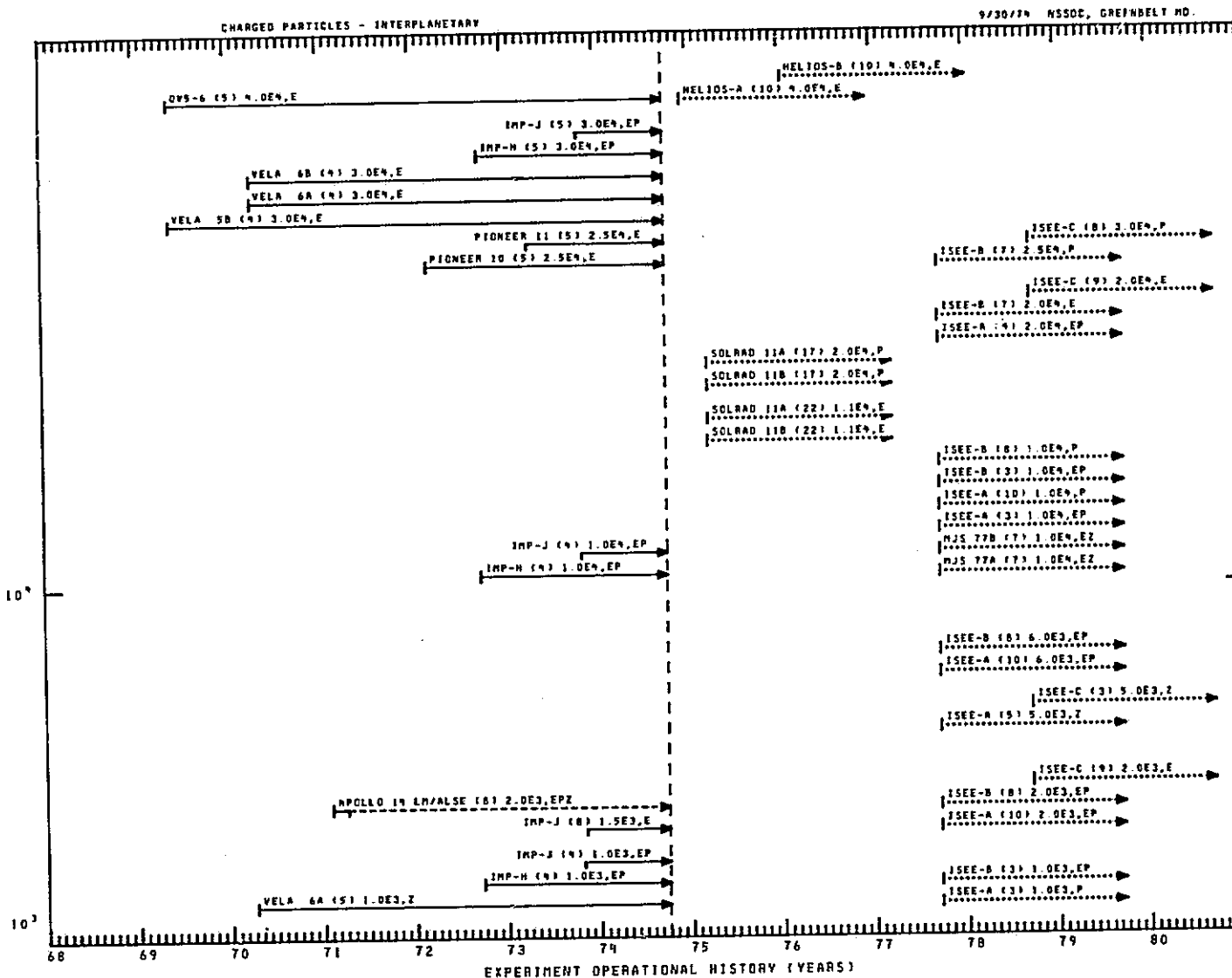




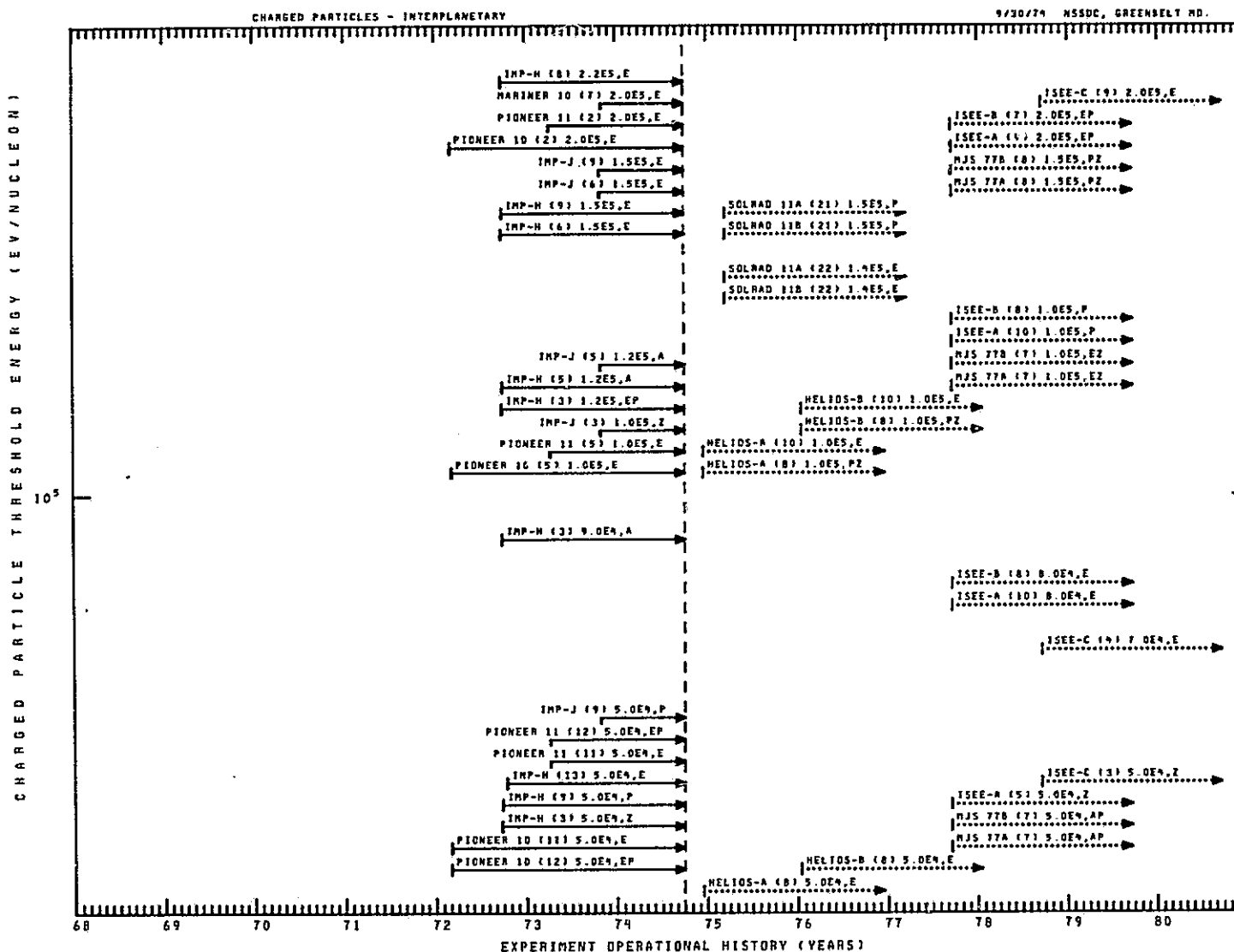


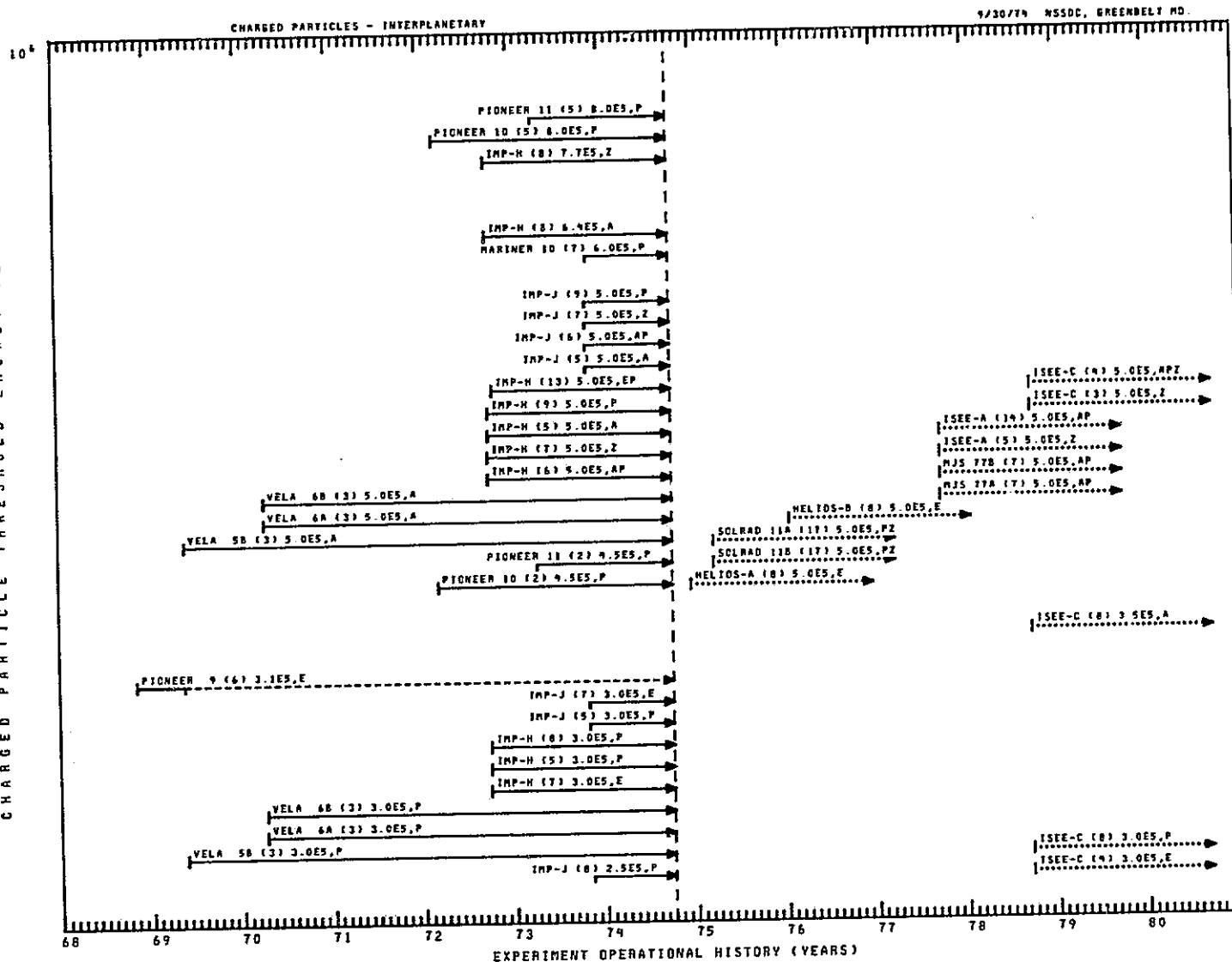


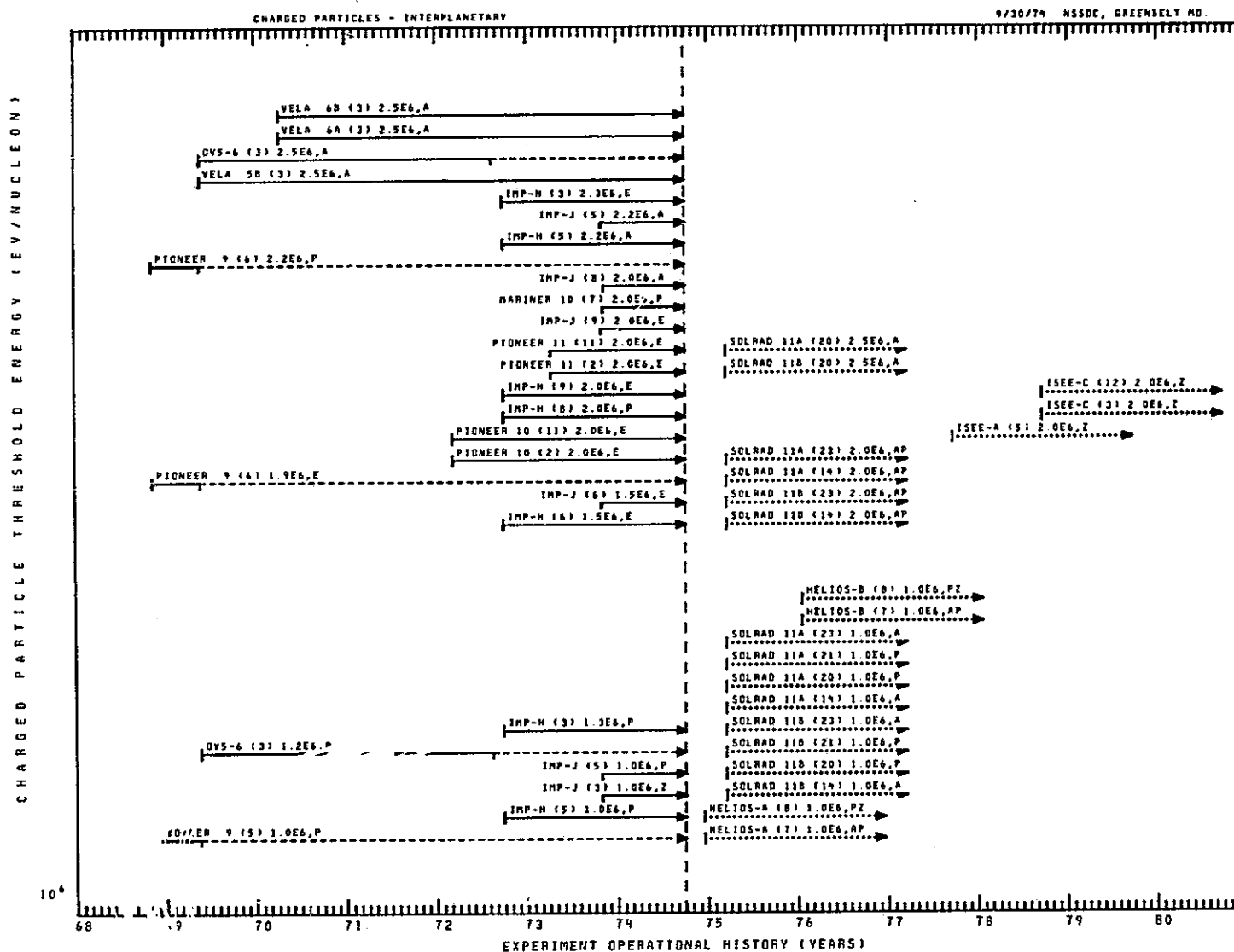




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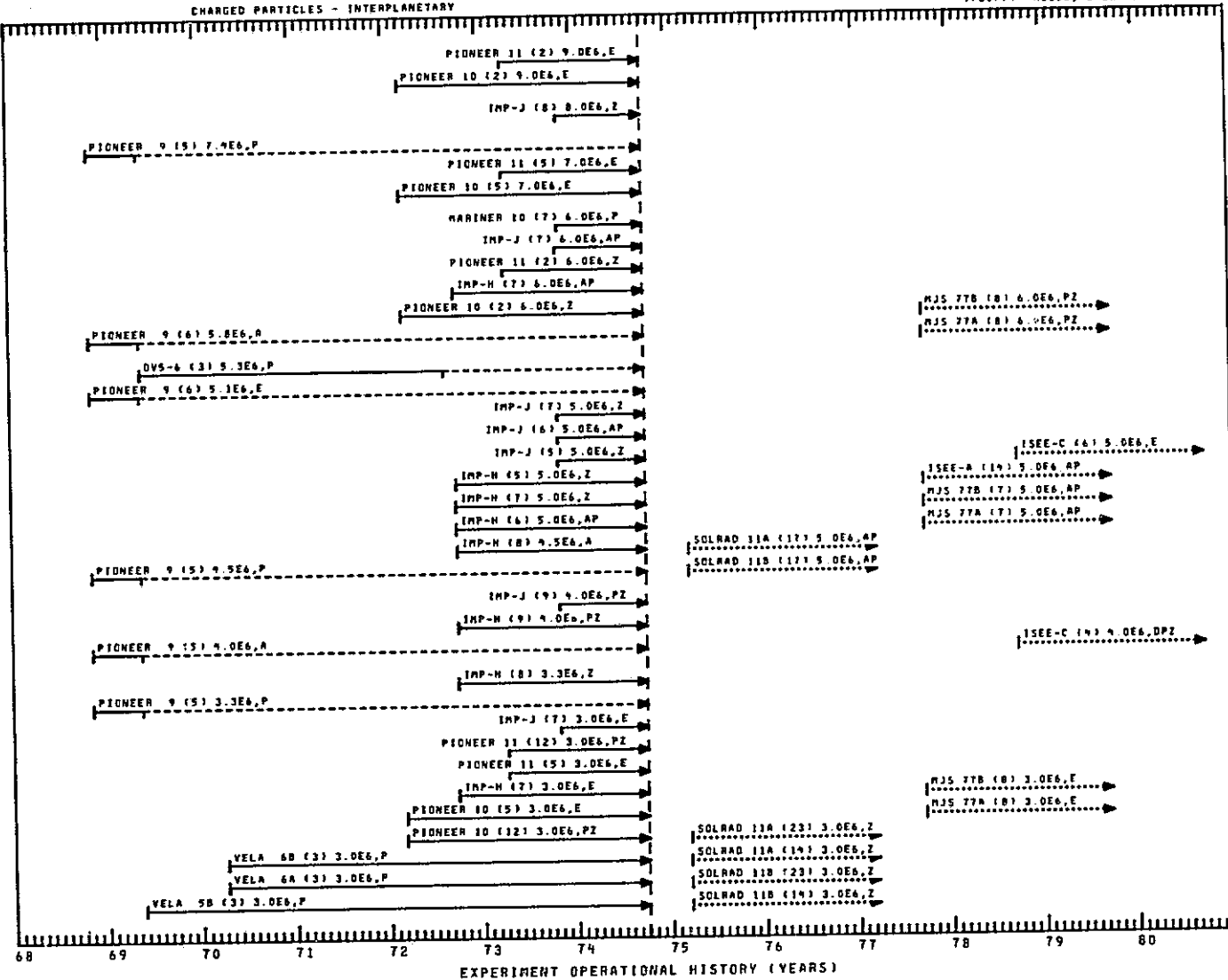


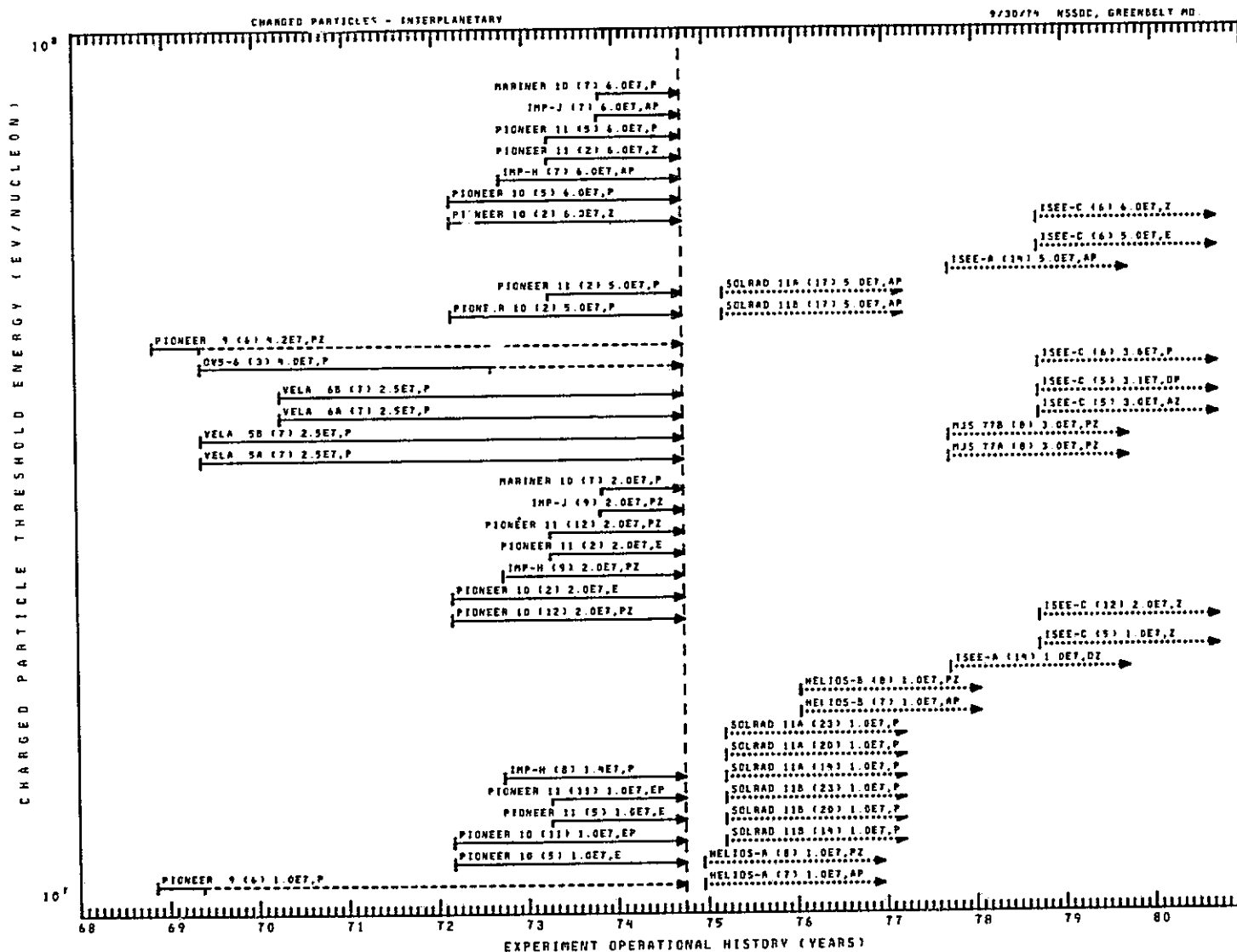


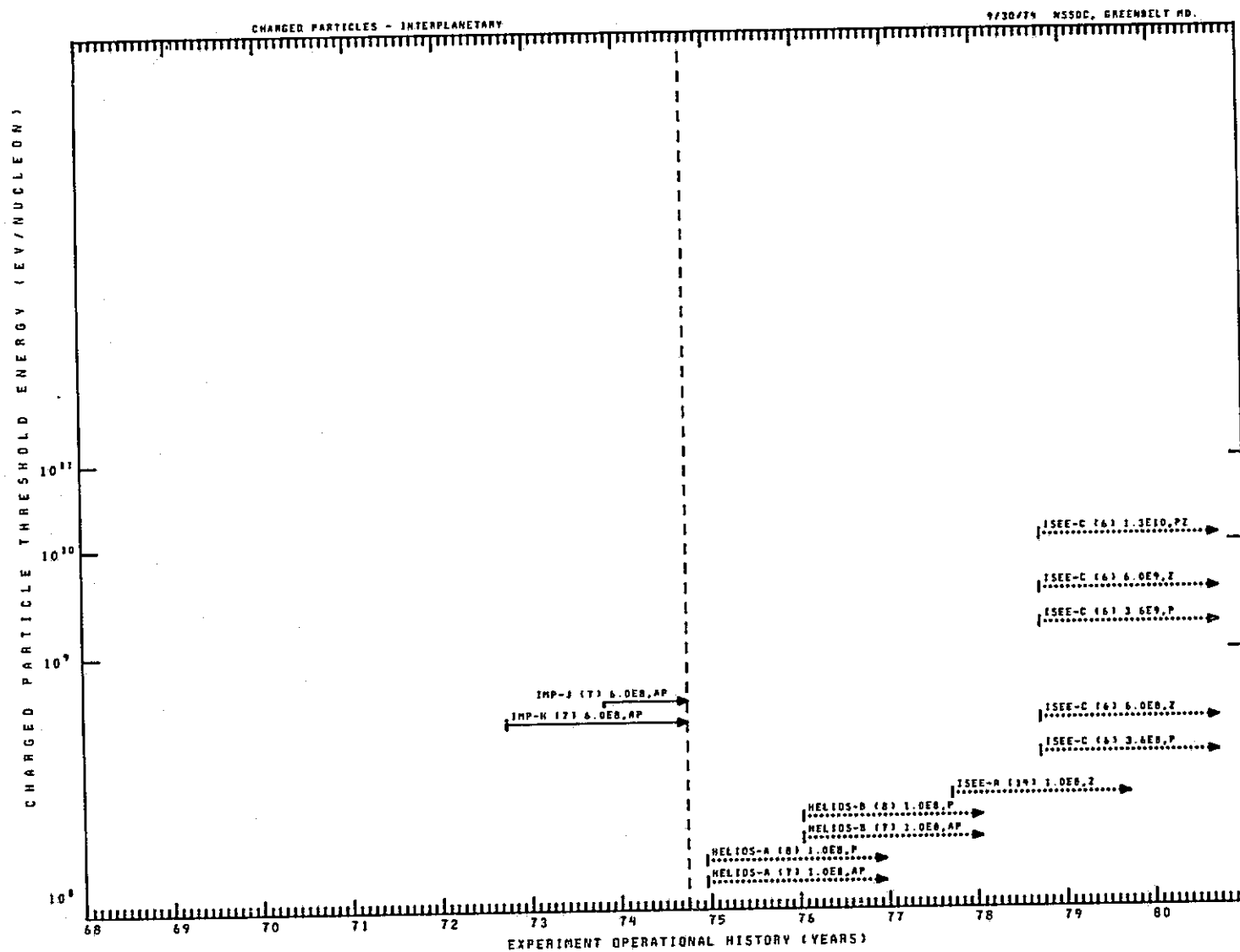
10⁷

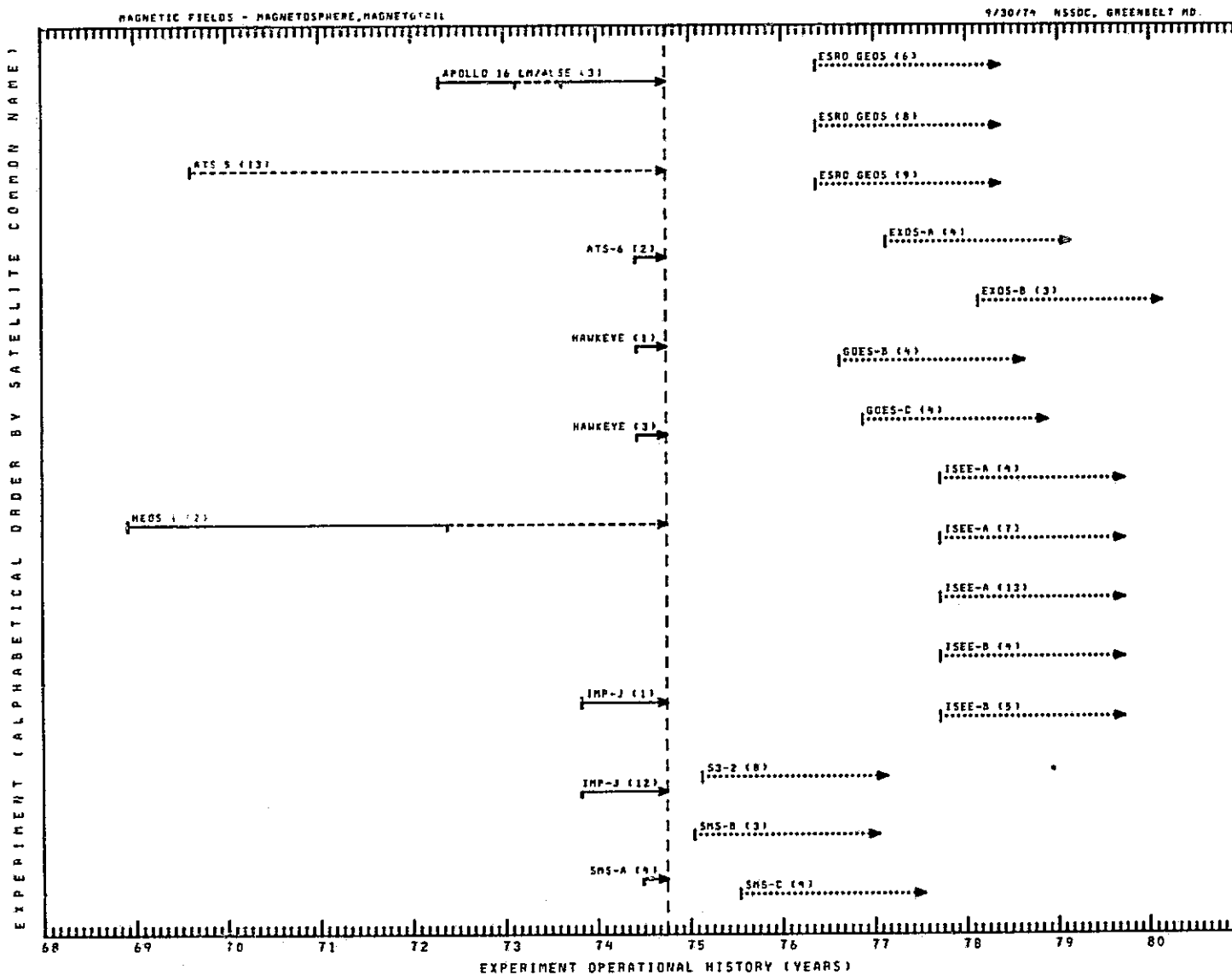
CHARGED PARTICLES - INTERPLANETARY

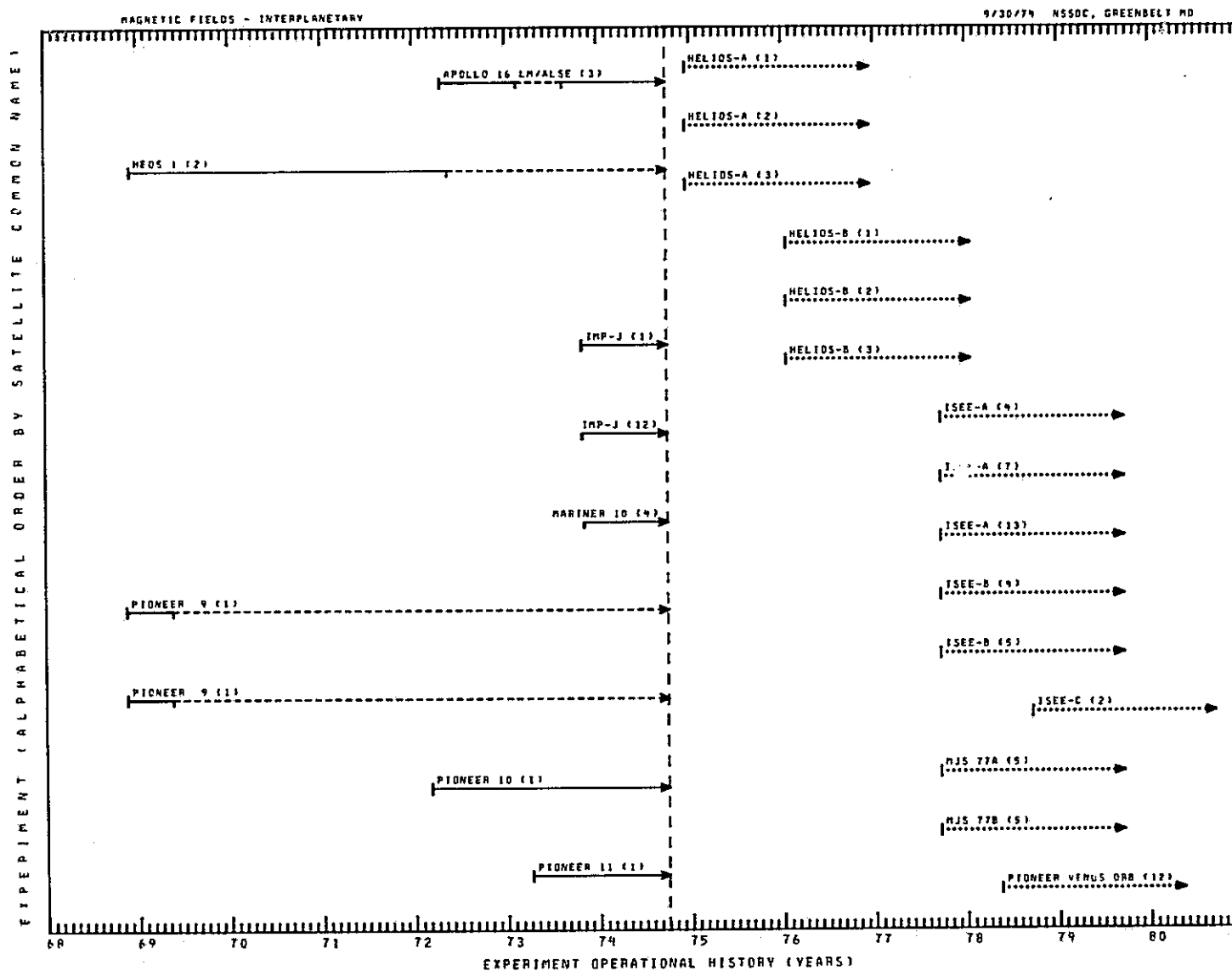
9/30/74 NSSDC GREENBELT MD.





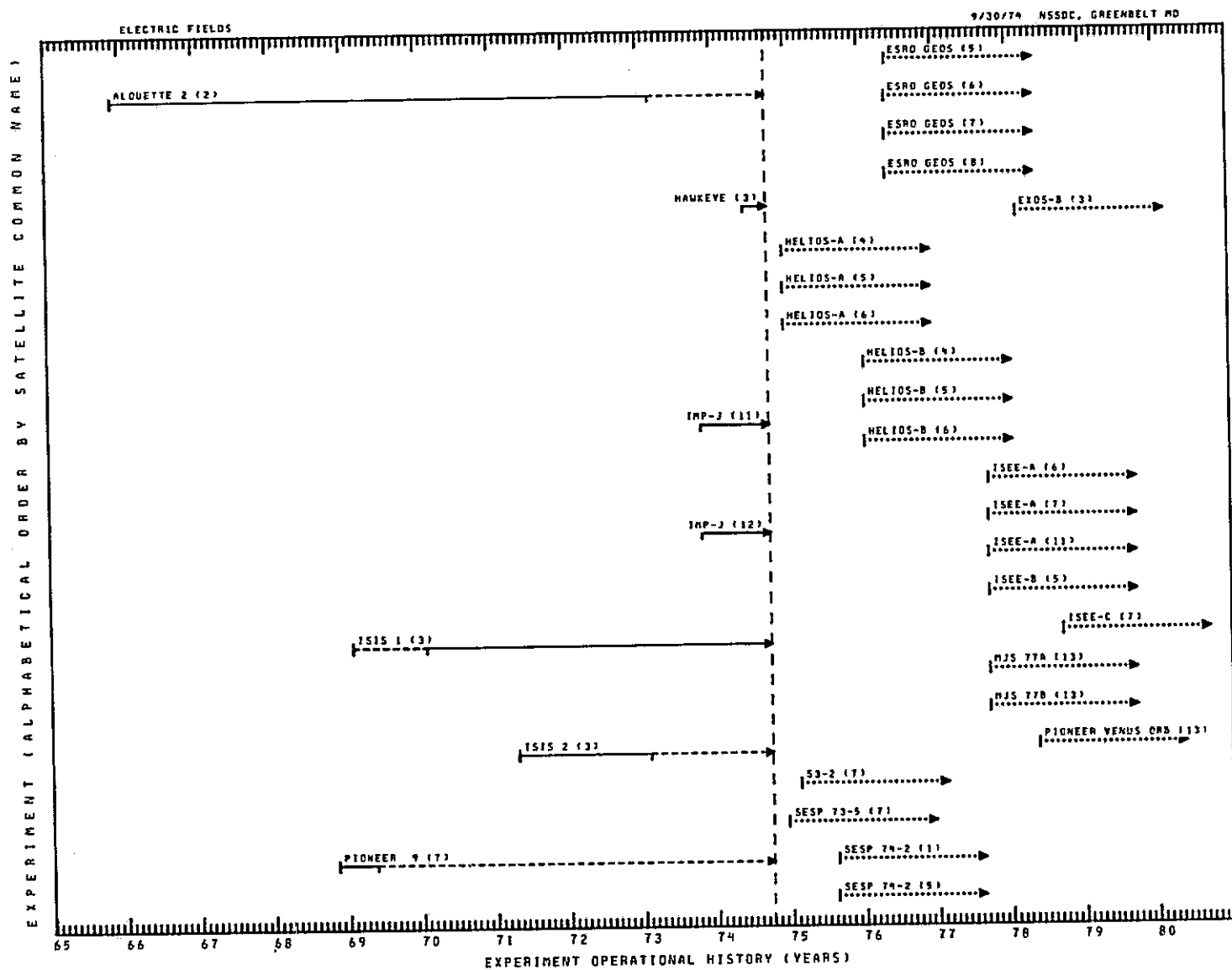


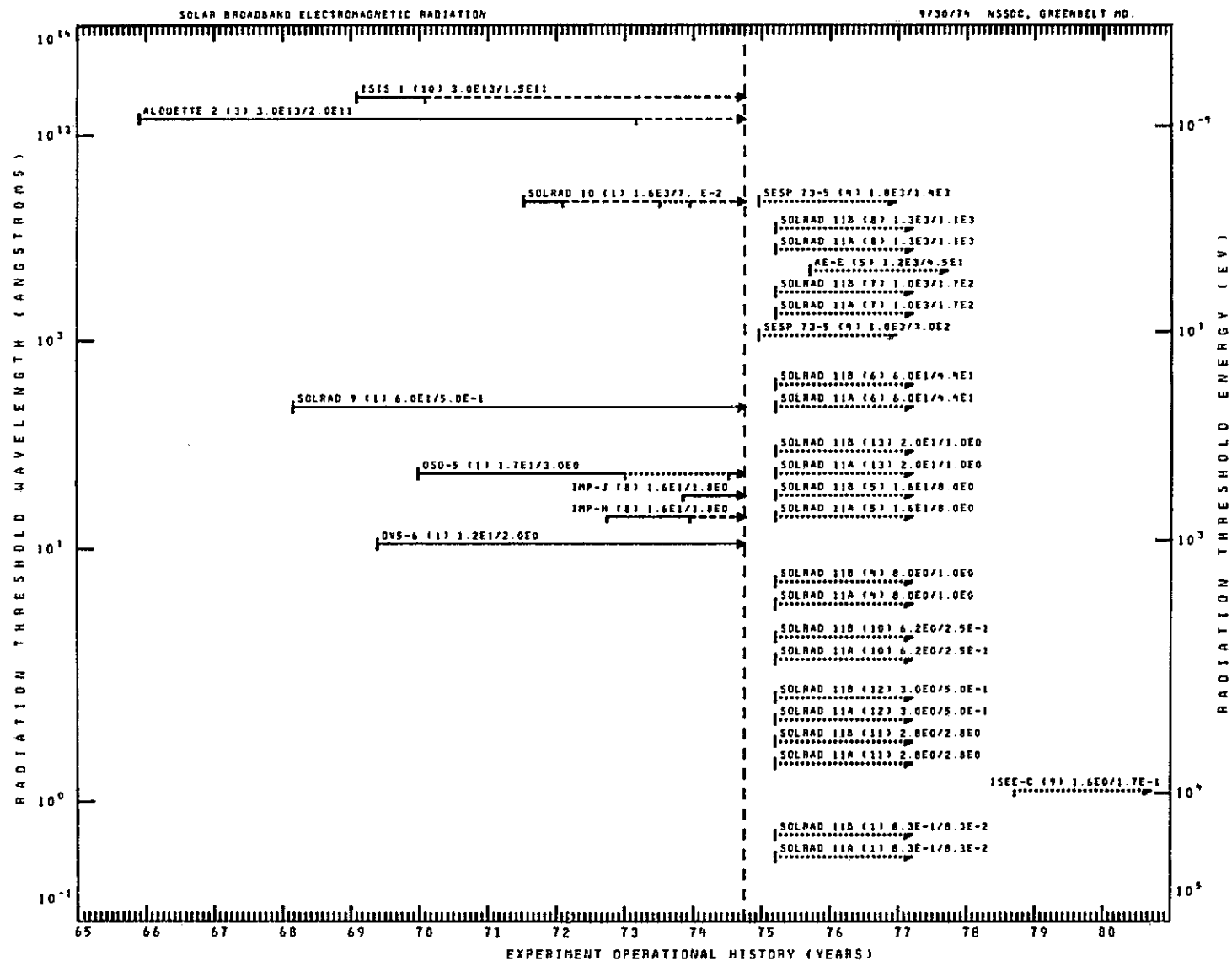


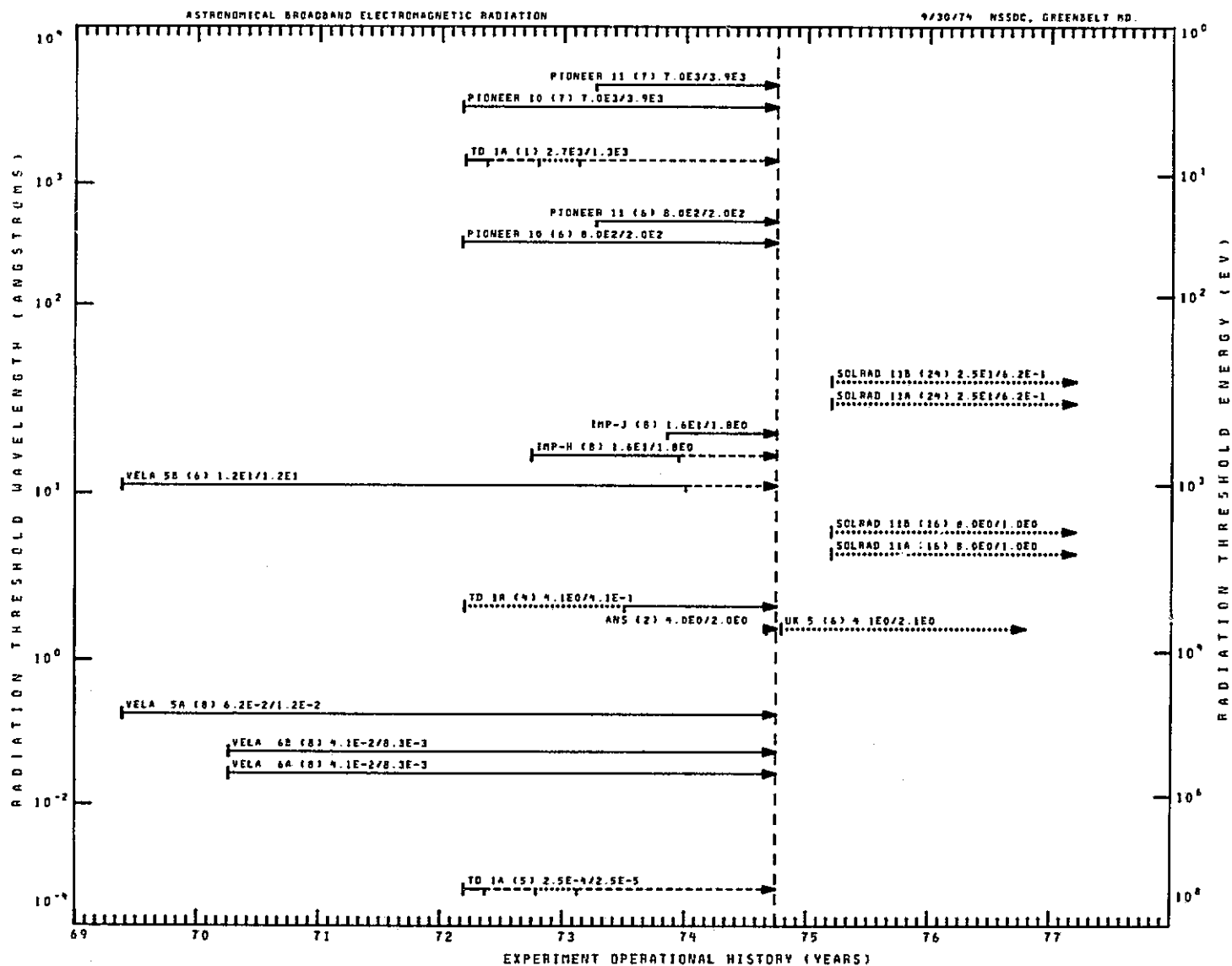


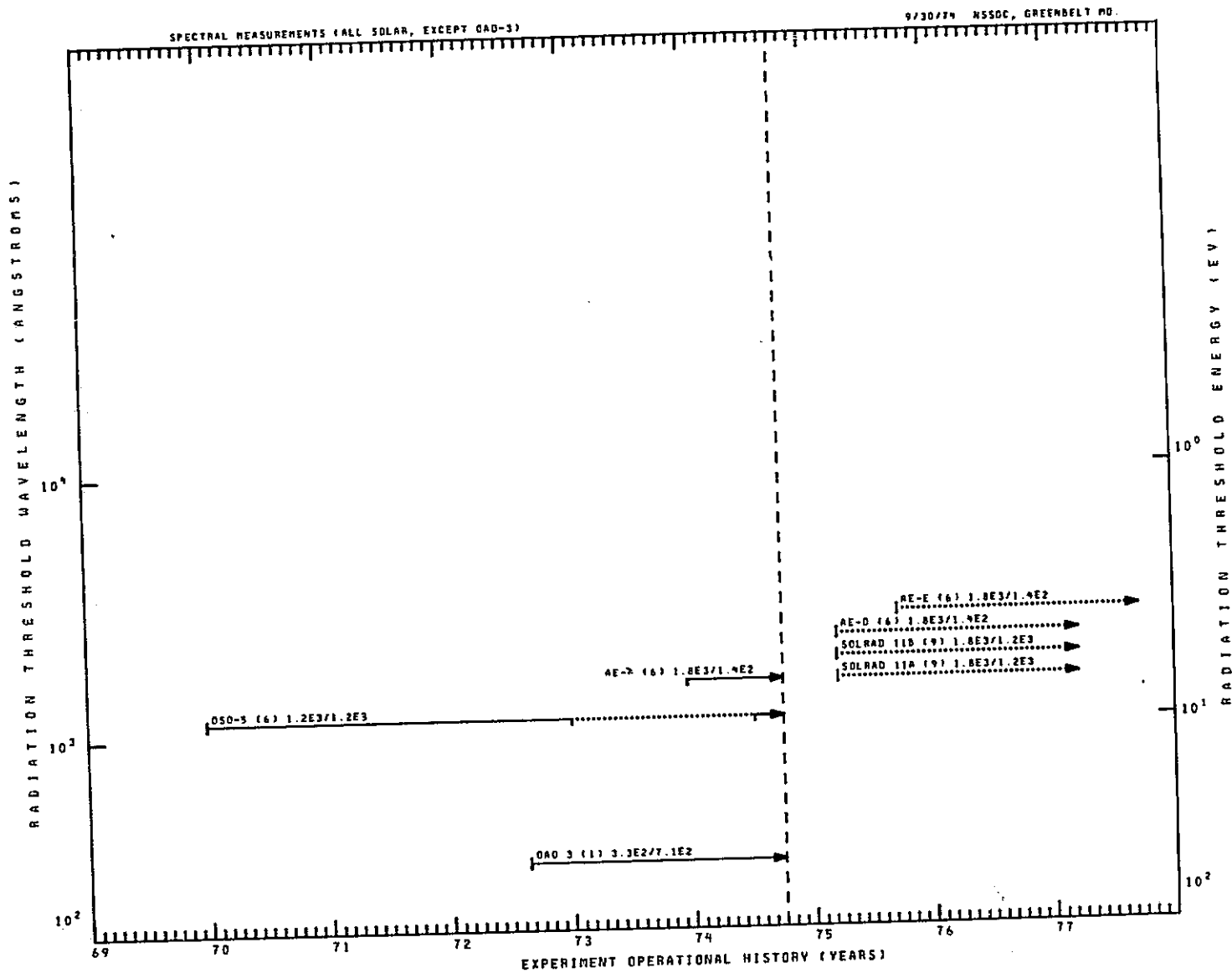
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3.4.2 Listings of Experiments by Phenomenon Measured

The following outline is used for listing experiments according to the phenomenon measured:

Outline

<u>Title</u>	<u>Page</u>
1. Electromagnetic Radiation Measurements	253
1.1 Electric Field Measurements	253
1.2 Magnetic Field Measurements	254
1.3 Electromagnetic Radiation Measurements (see section 4 for photography)	255
1.3.1 Sensing Sources Below 65 km	255
1.3.2 Sensing Sources From 65 to 3000 km	256
1.3.3 Sensing Magnetospheric Sources Above 3000 km	256
1.3.4 Sensing Interplanetary Space	256
1.3.5 Sensing Cold (planetary) Sources	257
1.3.6 Sensing the Sun	258
1.3.7 Sensing Hot (star) Sources	260
2. Charged Particle Measurements	262
2.1 Sensing Electrons	262
2.1.1 Thermal Energies (≤ 1 keV)	262
2.1.2 Energies Greater than Thermal (> 1 keV)	264
2.2 Sensing Protons or Hydrogen Ions	268
2.3 Sensing Helium Nuclei	275
2.4 Sensing Other Particle Species	278
3. Microscopic Neutral Measurements	281
3.1 Sensing Neutrons	281
3.2 Sensing Individual Atoms and/or Molecules	281
3.3 Sensing Atoms and/or Molecules Collectively	282
4. Observations of Macroscopic Bodies	285
4.1 Sensing Mercury	285
4.2 Sensing Venus	285
4.3 Sensing Earth	285
4.4 Sensing Earth's Moon	286
4.4.1 Geographic Features	NO HITS
4.4.2 Nongeographic Features	286
4.5 Sensing Mars	286
4.6 Sensing Jupiter	287
4.7 Sensing the Sun	287
4.8 Sensing Comets, Stars, and Galactic Regions	287
4.9 Sensing Micrometeorites, Meteors, etc.	287
4.10 Sensing Other Bodies	288

Outline (continued)

<u>Title</u>	<u>Page</u>
5. Other	288
5.1 Communications	288
5.2 Engineering/Technology	288
5.3 Life Sciences	288
5.4 Material Sciences	289
5.5 Navigation	NO HITS
5.6 Other	289

The information contained under each of the major headings in the outline is uniquely sorted. For example, under Electromagnetic Radiation Measurements, the units and range of measurement are listed. The first sort is by order of minimum observable value (frequency, wavelength, or proton energy) of the measured phenomenon (one exception is that wavelengths, in outline section 1.3, are sorted from the longest to the shortest of the maximum observable values); the second sort is by order of maximum observable value of the measured phenomenon; the last sort is by NSSDC ID code.

For Charged Particle Measurements, the primary sort is by order of the minimum observable value of the measured phenomenon, then by NSSDC ID code.

For Microscopic Neutral Measurements, the listing is sorted alphabetically by technique and then by NSSDC ID code. The keywords applicable to define technique are as follows:

- Drag Density
- Imagery
- Mass Spectrometry
- Other (Not EM Technique)
- Other EM Technique
- Reentry Package
- Total Density Sensor

The listing for Observations of Macroscopic Bodies is sorted alphabetically by technique and then by NSSDC ID code. The keywords applicable to define technique are as follows:

- Electromagnetic Signal Analysis
- Imagery
- Impact
- Orbit Analysis
- Other
- Radioactivity
- Samples
- Seismic Technique

Information is presented in the form of tables with a variety of column headings. It should be noted that the following column headings are common to all the items in the outline:

- Spacecraft Common Name
- NSSDC Experiment ID Code
- Principal Investigator Name
- NSSDC Experiment Title
- Region of Observation
- Pertinent Report Page Number (where the complete experiment entry is located)

The remaining column headings are self-explanatory except for (1) Planet, (2) Region, (3) *, and (4) RES. Brief explanations of these column headings are as follows:

(1) Planet: The planets are indicated in numerical order from the Sun. The Sun is designated as zero (0); numbers 1 through 9 indicate Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto, respectively. Letter M indicates the Earth's Moon.

(2) Region: For finer specification of location near the Earth, entries under the heading "Region" are used. For regions further from Earth, designations for Interplanetary Space (H) and Celestial regions (I) are used. Letters A through I are used to specify the following regions:

- A = < 65 km altitude
- B = > 65 km altitude; < 3000 km, Lat < 65°
- C = > 65 km altitude; < 3000 km, Lat 65° to 90°
- D = Magnetospheric; $L < 2 R_E$
- E = Magnetospheric; $2 R_E < L < 6 R_E$

F = Magnetospheric; $6 R_E < L < 10 R_E$
G = Magnetospheric; $L > 10 R_E$
H = Interplanetary Space
I = Celestial

- (3) *: For Electromagnetic Radiation Measurements (outline section 1), this column indicates ambient or remote sensor:

A = Ambient
R = Remote

For Microscopic Neutral Measurements (outline section 3), this column represents operational or experimental projects:

O = Operational
X = Experimental

- (4) RES: This column indicates species resolution for Charged Particle Measurements (outline section 2):

R = Resolved
P = Partially resolved
N = Unresolved
U = Unknown resolution

Species here refers to the separation of phenomena at the second level of outline divisions; i.e., "resolved" species would observe the differences between protons (outline section 2.2) and electrons (outline section 2.1).

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS		REGION	PLANET	PAGE
			MIN VALUE	MAX VALUE			
				(F OR S)			
				(LAMBDA)			
1. ELECTROMAGNETIC RADIATION MEASUREMENTS							
1.1 ELECTRIC FIELD MEASUREMENTS							
IMP-J	(73-070A-11)	AGGSON			GH		55
ELECTROSTATIC FIELDS			A				
SESP 73-5	(ST73-5A-07)	PRAG			C		121
ELF-VLF RECEIVER			A				
SJ-2	(ST73-6A-07)	SMIDY			C		117
ELECTRIC FIELD OBSERVATIONS			A				
SESP 74-2	(ST74-2A-01)	NOZER			CD		122
DC ELECTRIC FIELDS			A				
SESP 74-2	(ST74-2A-05)	SAGALYN			C		122
ELECTRIC FIELDS-ION DRIFT			A				
IMP-I	(71-019A-02)	AGGSON			DEFGH		53
ELECTROSTATIC FIELDS			A	0.000E-39 TO 7.800E-01 HZ			
ISEE-A	(MOTHER -06)	NOZER			DEFGH		60
DC TO 12-KHZ ELECTRIC FIELD PROBE			A	0.000E-39 TO 1.200E 01 HZ			
ISEE-A	(MOTHER -11)	HEPPNER			DEFGH		60
DC ELECTRIC FIELDS			A	0.000F-39 TO 1.200E 01 HZ			
INTERCOSMOS 10	(73-082A-02)	UNKNOWN			C		50
ELECTRIC FIELD MEASUREMENT				3.000E-02 TO 7.000E 01 HZ			
IMP-I	(71-019A-16)	GURNETT					
ELECTROSTATIC WAVES AND RADIO							
NOISE -- GSPC			A	1.000E-01 TO 1.000E 02 HZ	DEFGH		54
ISEE-A	(MOTHER -11)	HEPPNER			DEFGH		60
DC ELECTRIC FIELDS			A	1.000E-01 TO 3.200E 03 HZ			
IMP-J	(73-078A-12)	GURNETT			GH		56
ELECTROSTATIC WAVES AND RADIO NOISE			A	3.000E-01 TO 2.000E 05 HZ			
IMP-H	(72-073A-11)	SCARF			GH		52
PLASMA WAVE EXPERIMENT			A	1.000E 01 TO 1.000E 02 HZ			
ISEE-A	(MOTHER -07)	GURNETT					
10-KHZ TO 10-KHZ MAGNETIC AND 10-KHZ TO							
200-KHZ ELECTRIC FIELD TRIAXIAL PROBES			A	1.000E 01 TO 1.000E 04 HZ	DEFGH		59
MJS 77A	(MARN77A-13)	SCARF				6	5
PLASMA WAVE			A	1.000E 01 TO 5.600E 04 HZ			79
MJS 77U	(MARN77U-13)	SCARF				6	5
PLASMA WAVE			A	1.000E 01 TO 5.600E 04 HZ			01
IMP-H	(72-073A-11)	SCARF			GH		52
PLASMA WAVE EXPERIMENT			A	1.000E 01 TO 1.000E 05 HZ			
HELIO5-A	(HELIO-A-04)	GURNETT					
COARSE FREQUENCY, FINE TIME RESOLUTION			A	1.000E 01 TO 1.000E 05 HZ	H		46
SPECTRUM ANALYSIS							
HELIO5-A	(HELIO-A-05)	GURNETT					
FINE FREQUENCY, COARSE TIME RESOLUTION			A	1.000E 01 TO 1.000E 05 HZ	H		46
SPECTRUM ANALYSIS							
HELIO5-B	(HELIO-B-04)	GURNETT					
COARSE FREQUENCY, FINE TIME RESOLUTION			A	1.000E 01 TO 1.000E 05 HZ	H		48
SPECTRUM ANALYSIS							
HELIO5-B	(HELIO-B-05)	GURNETT					
FINE FREQUENCY, COARSE TIME RESOLUTION			A	1.000E 01 TO 1.000E 05 HZ	H		48
SPECTRUM ANALYSIS							
HAWKEYE 1	(74-040A-03)	GURNETT			DEFG		42
ELF/VLF RECEIVERS			A	1.000E 01 TO 1.780E 05 HZ			
ISEE-B	(DAUGHTER-05)	GURNETT					
10-KHZ TO 10-KHZ MAGNETIC AND 10-KHZ TO							
200-KHZ ELECTRIC FIELD MONOAXIAL PROBES			A	1.000E 01 TO 2.000E 05 HZ	DEFGH		62
ISEE-A	(MOTHER -07)	GURNETT					
10-KHZ TO 10-KHZ MAGNETIC AND 10-KHZ TO							
200-KHZ ELECTRIC FIELD TRIAXIAL PROBES			A	1.000E 01 TO 2.000E 05 HZ	DEFGH		59
ISEE-C	(HELOCTR-07)	SCARF					
20-KHZ TO 1-KHZ MAGNETIC AND 20-KHZ TO							
100-KHZ ELECTRIC FIELD DETECTORS			A	2.000E 01 TO 1.000E 05 HZ	H		64
IMP-I	(71-019A-03)	GURNETT					
ELECTROSTATIC WAVES AND RADIO							
NOISE -- IOWA			A	2.000E 01 TO 2.000E 05 HZ	DEFGH		54
ESRD GEOS	(ESGEO -06)	GENDRIN			F		35
ELECTROMAGNETIC WAVE FIELDS			A	3.000E 01 TO 1.000E 04 HZ			
ALOUETTE 2	(65-098A-02)	HELROSE			C		19
VLF RECEIVER			A	5.000E 01 TO 3.000E 04 HZ			
ISIS 1	(69-009A-03)	BARRINGTON			C		66
VLF RECEIVER			A	5.000E 01 TO 3.000E 04 HZ			
ISIS 2	(71-024A-03)	BARRINGTON			C		68
VLF RECEIVER			A	5.000E 01 TO 3.000E 04 HZ			
PIONEER VENUS ORBITER	(PI0700R-13)	SCARF			H	2	109
ELECTRIC FIELD DETECTOR			A	1.000E 02 TO 3.000E 04 HZ			
PIONEER 9	(68-100A-07)	SCARF			H		101
PLASMA WAVE DETECTOR			A	1.000E 02 TO 1.000E 05 HZ			
PIONEER 9	(68-100A-07)	SCARF			H		101
PLASMA WAVE DETECTOR			A	3.850F 02 TO 4.150E 02 HZ			
PIONEER 9	(68-100A-07)	SCARF			H		101
PLASMA WAVE DETECTOR			A	2.775E 04 TO 3.225E 04 HZ			
HELIO5-A	(HELIO-A-06)	GURNETT					
50-KHZ TO 2-MHZ RADIO WAVE			R	5.000E 04 TO 2.000E 06 HZ		0	46
HELIO5-B	(HELIO-B-06)	GURNETT					
50-KHZ TO 2-MHZ RADIO WAVE			R	5.000E 04 TO 2.000E 06 HZ		0	48
EXOS-B	(EXOS-B -03)	UNKNOWN					
ELECTROMAGNETIC FIELD FLUCTUATION							
DETECTORS			A		DE		37
ESK7 GEOS	(ESGEO -05)	PETIT			F		35
VLF FIELD ANTENNA			A				
ESRD GEOS	(ESGEO -07)	PETERSEN			F		35
DC FIELDS			A				
ESRD GEOS	(ESGEO -08)	MELZNER					
DC ELECTRIC FIELD AND GRADIENT D							
ELECTRON BEAM DEFLECTION			A		F		35

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ORIGINAL PAGE IS POOR

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS		REGION	PLANET	PAGE
			MIN VALUE	MAX VALUE (LAMBDA)			
1.2 MAGNETIC FIELD MEASUREMENTS							
HEOS 1	(68-109A-07)	ELLIOT					
INTERPLANETARY MAGNETIC FIELDS.....			A		GH		90
IMP-J	(73-078A-12)	GURNETT					
ELECTROSTATIC WAVES AND RADIO NOISE.....			A		GH		56
INTERLUSSOS 10	(73-082A-01)	UNKNOWN					
MAGNETIC FIELD MEASUREMENT.....			A		C		98
MAHINEN 10	(73-085A-04)	NESS					
FLUXGATE MAGNETOMETERS.....			A		H	12	76
HELIOS-A	(HELI0-A-02)	NESS					
FLUXGATE MAGNETOMETER FOR AVERAGE FIELDS.....			A		H		47
HELIOS-B	(HELI0-B-02)	NESS					
FLUXGATE MAGNETOMETER FOR AVERAGE FIELDS.....			A		H		49
NJS 77A	(MAHNT7A-05)	NESS					
TRIAXIAL FLUXGATE MAGNETOMETERS.....			A		H	6 5	79
NJS 77H	(MAHNT7H-05)	NESS					
TRIAXIAL FLUXGATE MAGNETOMETERS.....			A		H	6 5	81
SJ-2	(5773-6A-08)	SMIDY					
MAGNETOMETER.....			A		C		117
SESP 73-B	(5773-5A-07)	PHAG					
ELF-VLF RECEIVER.....			A		C		121
VIKING-A LANDER	(VIKG-AL-10)	HARGRAVES					
MAGNETIC PROPERTIES.....			A			4	143
VIKING-B LANDER	(VIKG-BL-10)	HARGRAVES					
MAGNETIC PROPERTIES.....			A			4	146
ISEE-C	(HFLOCT-13)	W. COX					
SOLAR AND INTERPLANETARY MAGNETIC FIELDS (CORRELATIVE STUDY).....			R	0.000E-39 TO 1.000E-02 HZ		0	65
PIONEER 11	(73-019A-14)	NESS					
JOVIAN MAGNETIC FIELD.....			A	0.000E-39 TO 3.000E-02 HZ		5	106
PIONEER VENUS ORBITER	(PI078B-12)	RUSSELL					
TRIAXIAL FLUXGATE MAGNETOMETER.....			A	0.000E-39 TO 6.250E-02 HZ	H	2	109
ATS 5	(69-069A-13)	SUGIURA					
MAGNETIC FIELD MONITOR.....			A	0.000E-39 TO 9.800E-02 HZ	F		29
HELIOS-A	(HELI0-A-01)	NEUBAUER					
FLUXGATE MAGNETOMETER FOR FIELD FLUCTUATIONS.....			A	0.000E-39 TO 2.500E-01 HZ	H		47
HELIOS-B	(HELI0-B-01)	NEUBAUER					
FLUXGATE MAGNETOMETER FOR FIELD FLUCTUATIONS.....			A	0.000E-39 TO 2.500E-01 HZ	H		49
PIONEER 8	(67-123A-01)	NESS					
SINGLE-AXIS MAGNETOMETER.....			A	0.000E-39 TO 9.000E-01 HZ	G		99
PIONEER 8	(67-123A-01)	NESS					
SINGLE-AXIS MAGNETOMETER.....			A	0.000E-39 TO 9.000E-01 HZ	H		99
PIONEER 9	(68-100A-01)	SONETT					
THREE-AXIS MAGNETOMETER.....			A	0.000E-39 TO 8.000E-01 HZ	H		101
APOLLO 16 LM/ALSEP	(72-031C-03)	DYAL					
LUNAR SURFACE MAGNETOMETER.....			A	0.000E-39 TO 1.000E 00 HZ	GH	M	24
PIONEER VENUS ORBITER	(PI078B-12)	RUSSELL					
TRIAXIAL FLUXGATE MAGNETOMETER.....			A	0.000E-39 TO 2.000E 00 HZ		2	109
ISEE-C	(HFLOCT-02)	SMITH					
MAGNETIC FIELDS.....			A	0.000E-39 TO 3.000E 00 HZ	H		65
ATS 6	(74-039A-02)	CULEMAN, JR.					
MAGNETOMETER EXPERIMENT.....			A	0.000E-39 TO 4.000E 00 HZ	F		29
ESRO GEOS	(ESGEO -06)	MARIANI					
TRIAXIAL FLUXGATE MAGNETOMETER.....			A	0.000E-39 TO 5.000E 00 HZ	F		35
IMP-1	(71-019A-01)	NESS					
MEASUREMENT OF MAGNETIC FIELDS.....			A	0.000E-39 TO 6.250E 00 HZ	DEFGH		54
HAWKEYE 1	(74-040A-01)	VAN ALLEN					
TRIAXIAL FLUXGATE MAGNETOMETER.....			A	0.000E-39 TO 1.000E 01 HZ	DEFG		42
ISEE-2	(DAUGHTN-04)	RUSSELL					
MAGNETIC FIELDS.....			A	0.000E-39 TO 1.000E 01 HZ	F		63
ISEE-A	(MOTHER -04)	RUSSELL					
MAGNETIC FIELDS.....			A	0.000E-39 TO 1.000E 01 HZ	FGH		61
IMP-J	(73-078A-01)	NESS					
MAGNETIC FIELD EXPERIMENT.....			A	0.000E-39 TO 1.250E 01 HZ	GH		56
SMS-A	(74-033A-04)	WILLIAMS					
MAGNETIC FIELD MONITOR.....			A		F		123
PIONEER 11	(73-019A-01)	SMITH					
MAGNETIC FIELDS.....			A		H	5	106
PIONEER 10	(72-012A-01)	SMITH					
MAGNETIC FIELDS.....			A		H	5	103
ISEE-C	(HFLOCT-02)	SMITH					
MAGNETIC FIELDS.....			A	1.000E-01 TO 1.000E 01 HZ	H		65
ESRO GEOS	(ESGEO -06)	GENDRIN					
ELECTROMAGNETIC WAVE FIELDS.....			A	1.000E-01 TO 3.500E 03 HZ	F		35
HELIOS-A	(HELI0-A-03)	NEUBAUER					
SEARCH COIL MAGNETOMETER.....			A	5.000E 00 TO 3.000E 03 HZ	H		47
HELIOS-B	(HELI0-B-03)	NEUBAUER					
SEARCH COIL MAGNETOMETER.....			A	5.000E 00 TO 3.000E 03 HZ	H		49
IMP-H	(72-073A-11)	SCARF					
PLASMA WAVE EXPERIMENT.....			A	1.000E 01 TO 1.000E 02 HZ	GH		52
ISEE-B	(DAUGHTN-05)	GURNETT					
10-KHZ TO 10-KHZ MAGNETIC AND 10-KHZ TO 200-KHZ ELECTRIC FIELD MONOAXIAL PROBES.....			A	1.000E 01 TO 1.000E 04 HZ	OFFGH		62
ISEE-A	(MOTHER -07)	GURNETT					
10-KHZ TO 10-KHZ MAGNETIC AND 10-KHZ TO 200-KHZ ELECTRIC FIELD TRIAXIAL PROBES.....			A	1.000E 01 TO 1.000E 04 HZ	DEFGH		59
IMP-H	(72-073A-11)	SCARF					
PLASMA WAVE EXPERIMENT.....			A	1.000E 01 TO 1.000E 05 HZ	GH		52
HAWKEYE 1	(74-040A-01)	GURNETT					
ELF-VLF RECEIVERS.....			A	1.000E 01 TO 1.780E 05 HZ	DEF		42
ISEE-L	(HFLOCTN-07)	SCARF					
20-KHZ TO 1-KHZ MAGNETIC AND 20-KHZ TO 100-KHZ ELECTRIC FIELD DETECTORS.....			A	2.000E 01 TO 1.000E 03 HZ	H		64
IMP-I	(71-019A-03)	GURNETT					
ELECTROSTATIC WAVES AND RADIO NOISE -- 1.1MA.....			A	2.000E 01 TO 2.000E 05 HZ	DEFGH		54

SATELLITE NAME	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS	REGION	PLANET	
DESCRIPTION	EXPERIMENT TITLE		MIN VALUE	MAX VALUE (OR 1)	MIN	MAX
1.2 MAGNETIC FIELD MEASUREMENTS						
GOES-B	(GOES-B-04)	WILLIAMS				
MAGNETIC FIELD MONITOR.....			A		F	40
GOES-C	(GOES-C-04)	WILLIAMS				
MAGNETIC FIELD MONITOR.....			A		F	41
SMS-C	(SMS-C-04)	WILLIAMS				
MAGNETIC FIELD MONITOR.....			A		F	125
ESRO GEMS	(ESRO -04)	MELZNER				
DC ELECTRIC FIELD AND GRADIENT 0						
ELECTRON BEAM DEFLECTION.....			A		F	35
ISEG-A	(MOTHER-13)	HELLIWELL				
VLF WAVE INJECTION.....			A	1.000E 03 TO 2.000E 04 HZ	DEFGH	60
SMS-B	(SMS-B-03)	WILLIAMS				
MAGNETIC FIELD MONITOR.....			A		F	124
EXOS-B	(EXOS-B-03)	UNKNOWN				
ELECTROMAGNETIC FIELD FLUCTUATION						
DETECTORS.....			A		DE	37
EXOS-A	(EXOS-A-04)	UNKNOWN				
MAGNETOMETER.....			A		C	37
1.3 ELECTROMAGNETIC RADIATION MEASUREMENTS (SEE SECTION 4 FOR PHOTOGRAPHY)						
1.3.1 SENSING SOURCES BELOW 65 KM						
TIROS-H	(TIROS-H-02)	NESS STAFF				
TIROS OPERATIONAL VERTICAL SOUNDER						
(TOVS).....			R	5.455E 10 TO 5.455E 10 HZ	A	3
TIROS-I	(TIROS-I-02)	NESS STAFF				
TIROS OPERATIONAL VERTICAL SOUNDER						
(TOVS).....			R	5.455E 10 TO 5.455E 10 HZ	A	3
TIROS-J	(TIROS-J-02)	NESS STAFF				
TIROS OPERATIONAL VERTICAL SOUNDER						
(TOVS).....			R	5.455E 10 TO 5.455E 10 HZ	A	3
TIROS-N	(TIROS-N-02)	NESS STAFF				
TIROS OPERATIONAL VERTICAL SOUNDER						
(TOVS).....			R	5.455E 10 TO 5.455E 10 HZ	A	3
NIMBUS 4	(70-025A-05)	HEATH				
BACKSCATTER ULTRAVIOLET (BUV)						
SPECTROMETER.....			R	1.500E 01 TO 1.450E 01 MIC	A	3
ERTS-B	(ERTS-B-02)	ARLUSKAS				
MULTISPECTRAL SCANNER (MSS).....			R	1.260F 01 TO 1.047E 01 MIC	A	3
GOES-B	(GOES-B-01)	NESS STAFF				
VISIBLE-INFRARED SPIN-SCAN RADIOMETER						
(VISSR).....			R	1.250F 01 TO 1.050F 01 MIC	A	3
GOES-C	(GOES-C-01)	NESS STAFF				
VISIBLE-INFRARED SPIN-SCAN RADIOMETER						
(VISSR).....			R	1.250F 01 TO 1.050F 01 MIC	A	3
SMS-A	(74-033A-01)	NESS STAFF				
VISIBLE-INFRARED SPIN-SCAN RADIOMETER						
(VISSR).....			R	1.250F 00 TO 2.500E-01 MIC	A	3
SMS-A	(74-033A-01)	NESS STAFF				
VISIBLE-INFRARED SPIN-SCAN RADIOMETER						
(VISSR).....			R	7.500F-01 TO 5.500E-01 MIC	A	3
SMS-B	(SMS-B-04)	NESS STAFF				
VISIBLE-INFRARED SPIN-SCAN RADIOMETER						
(VISSR).....			R	7.500E-01 TO 5.500E-01 MIC	A	3
SMS-C	(SMS-C-01)	NESS STAFF				
VISIBLE-INFRARED SPIN-SCAN RADIOMETER						
(VISSR).....			R	7.500E-01 TO 5.500E-01 MIC	A	3
NOAA 2	(72-082A-02)	NESS STAFF				
SCANNING RADIOMETER (SR).....			R	7.300E-01 TO 5.200E-01 MIC	A	3
NOAA J	(73-086A-02)	NESS STAFF				
SCANNING RADIOMETER (SR).....			R	7.300F-01 TO 5.200E-01 MIC	A	3
NOAA 3	(73-086A-03)	NESS STAFF				
VERY HIGH RESOLUTION RADIOMETER (VHRP).....			R	7.300E-01 TO 5.200E-01 MIC	A	3
NOAA 4	(ITOS-G-02)	NESS STAFF				
SCANNING RADIOMETER (SR).....			R	7.300F-01 TO 5.200E-01 MIC	A	3
NOAA 4	(ITOS-G-03)	NESS STAFF				
VERY HIGH RESOLUTION RADIOMETER (VHRR).....			R	7.300E-01 TO 5.200F-01 MIC	A	3
ITOS-H	(ITOS-H-01)	NESS STAFF				
ADVANCED VERY HIGH RESOLUTION						
RADIOMETER (AVHRR).....			R	7.000E-01 TO 5.000E-01 MIC	A	3
ITOS-I	(ITOS-I-01)	NESS STAFF				
ADVANCED VERY HIGH RESOLUTION						
RADIOMETER (AVHRR).....			R	7.000E-01 TO 5.000E-01 MIC	A	3
ITOS-J	(ITOS-J-01)	NESS STAFF				
ADVANCED VERY HIGH RESOLUTION						
RADIOMETER (AVHRR).....			R	7.000E-01 TO 5.000E-01 MIC	A	3
TIROS-N	(TIROS-N-01)	NESS STAFF				
ADVANCED VERY HIGH RESOLUTION						
RADIOMETER (AVHRR).....			R	7.000E-01 TO 5.000E-01 MIC	A	3
OSO-1	(OSO-1-00)	WELLER, JR.				
EUV FROM EARTH AND SPACE.....			R	1.230E-01 TO 1.500E-02 MIC	A	3
RM 20	(RM20-04)	PEPIN				
STRATOSPHERIC AEROSOL PROFILE						
OBSERVATIONS NEAR SUNRISE/SET.....			R		A C	3
RM 20	(RM20-04)	PEPIN				
STRATOSPHERIC AEROSOL PROFILE						
OBSERVATIONS NEAR SUNRISE/SET.....			R		A C	3

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID EXPERIMENT TITLE	EXPERIMENTER	RANGE OF		MEASUREMENTS	REGION	PLANET	PAGE
			MIN VALUE	(F OR E)	MAX	ADCODEFGHI/0123456	6789	
1.3.2 SENSING SOURCES FROM 65 TO 3000 KM								
INTERCOSMOS 10	(73-082A-04)	UNKNOWN	R	2.200E 00 TO 2.200E 04 HZ	C			58
VLF EMISSIONS.....								
ISIS 1	(69-009A-01)	WHITTEKER	R	1.000E 05 TO 2.000E 07 HZ	C			67
SWEEP FREQUENCY SOUNDER.....								
ISIS 2	(71-024A-01)	WHITTEKER	R	1.000E 05 TO 2.000E 07 HZ	C			70
SWEEP FREQUENCY SOUNDER.....								
ISIS 2	(71-024A-02)	CALVERT	R	1.200E 05 TO 9.300E 06 HZ	C			68
FIXED FREQUENCY SOUNDER.....								
ALOUETTE 2	(65-098A-01)	WHITTEKER	R	1.200E 05 TO 1.450E 07 HZ	C			20
SWEEP FREQUENCY SOUNDER.....								
ISIS 1	(69-009A-02)	CALVERT	R	2.500E 05 TO 9.300E 06 HZ	C			66
FIXED FREQUENCY SOUNDER.....								
ATS 6	(74-039A-09)	DAVIES	R	4.000E 07 TO 3.600E 08 HZ	D	H		29
RADIO BEACON.....								
INTASAT	(INTASAT-01)	UNKNOWN	R	4.001E 07 TO 4.101E 07 HZ	C			58
IONOSPHERIC BEACON.....								
ISIS 2	(71-024A-09)	PORSYTH	R	1.360E 08 TO 1.370E 08 HZ	C			69
RADIO BEACON.....								
EXOS-A	(EXOS-A-03)	UNKNOWN	R	3.000E-01 TO 1.000E-01 MIC	BC			36
X-RAY AND ULTRAVIOLET AURORAL TELESCOPES.....								
SOLRAD 11A	(SRD-11A-18)	WELLER, JR.	R	1.400E-01 TO 2.000E-02 MIC	C	I		130
GEOCORONAL-EXTRATERRESTRIAL EUV - DETECTOR 1.....	(SRD-11A-19)	WELLER, JR.	R	1.400E-01 TO 2.000E-02 MIC	C	I		130
SOLRAD 11A	(SRD-11A-19)	WELLER, JR.	R	1.400E-01 TO 2.000E-02 MIC	C	I		133
GEOCORONAL-EXTRATERRESTRIAL EUV - DETECTOR 2.....	(SRD-11B-18)	WELLER, JR.	R	1.400E-01 TO 2.000E-02 MIC	C	I		134
SOLRAD 11B	(SRD-11B-19)	WELLER, JR.	R	1.400E-01 TO 2.000E-02 MIC	C	I		133
GEOCORONAL-EXTRATERRESTRIAL EUV - DETECTOR 1.....	(SRD-11D-19)	WELLER, JR.	R	1.400E-01 TO 2.000E-02 MIC	C	I		134
SOLRAD 11B	(SRD-11D-19)	WELLER, JR.	R	1.400E-01 TO 2.000E-02 MIC	C	I		134
GEOCORONAL-EXTRATERRESTRIAL EUV - DETECTOR 2.....								
DSO 5	(69-006A-06)	BLAMONT	R	1.216E-01 TO 1.216E-01 MIC	BC			93
MEASUREMENT OF THE SELF REVERSAL OF THE SOLAR LYMAN ALPHA LINE.....								
EXOS-A	(EXOS-A-03)	UNKNOWN	R	1.000E-02 TO 1.000E-04 MIC	BC			36
X-RAY AND ULTRAVIOLET AURORAL TELESCOPES.....								
SOLRAD 11A	(SRD-11A-16)	BYRAM	R	0.000E-04 TO 1.000E-04 MIC	C	I		127
STELLAR/AURORAL X RAYS.....								
SOLRAD 11B	(SRD-11B-16)	BYRAM	R	0.000E-04 TO 1.000E-04 MIC	C	I		131
STELLAR/AURORAL X RAYS.....								
ISS	(ISS -02)	UNKNOWN	R		C			71
RADIO NOISE.....								
RH 20	(RM20 -02)	FREEMAN	R		C			116
TRANSIONOSPHERIC EFFECTS ON WIDEBAND RADIO SIGNALS.....								
RH 20	(RM20 -04)	PEPIN	R		C			116
STRATOSPHERIC AEROSOL PROFILE OBSERVATIONS NEAR SUNRISE/SET.....			R		A C		3	116
RH 20	(RM20 -04)	PEPIN	R		A C		3	116
STRATOSPHERIC AEROSOL PROFILE OBSERVATIONS NEAR SUNRISE/SET.....			R		A C		3	116
1.3.3 SENSING MAGNETOSPHERIC SOURCES ABOVE 3000 KM								
IMP-I	(71-019A-12)	KELLOGG	A	2.300E 01 TO 2.000E 05 HZ	DEFGH			54
ELECTROSTATIC WAVES AND RADIO NOISE -- MINN.....								
ISCE-U	(DAUGHTER-06)	HARVEY	R	3.000E 08 TO 3.000E 08 HZ	EF GH			62
RADIO PROPAGATION RECEIVER.....								
ISCE-A	(MOTHER-08)	HARVEY	R	3.000E 08 TO 3.000E 08 HZ	DEFGH			60
ACTIVE PLASMA EXPERIMENT.....								
1.3.4 SENSING INTERPLANETARY SPACE								
MARINER 10	(73-085A-02)	HOWARD	R			H	12	76
S- AND X-BAND RADIO PROPAGATION.....								
ATS 6	(74-039A-09)	DAVIES	R	4.000E 07 TO 3.600E 08 HZ	D	H		29
RADIO BEACON.....								
DSO 5	(69-006A-07)	NEY	R	8.500E-01 TO 3.500E-01 MIC				93
ZODIACAL LIGHT MONITOR.....								
PIONEER 10	(73-012A-14)	WEINBERG	R	7.000E-01 TO 3.900E-01 MIC				104
ZODIACAL-LIGHT TWO-COLOR PHOTOPOLARIMETRY.....								
PIONEER 11	(73-019A-15)	WEINBERG	R	7.000E-01 TO 3.900E-01 MIC				106
ZODIACAL-LIGHT TWO-COLOR PHOTOPOLARIMETRY.....								
PIONEER 10	(72-012A-07)	GENRELS	R	7.000E-01 TO 3.900E-01 MIC				102
IMAGING PHOTOPOLARIMETER (IPP).....								
PIONEER 11	(73-019A-07)	GENRELS	R	7.000E-01 TO 3.900E-01 MIC				105
IMAGING PHOTOPOLARIMETER.....								
PIONEER 10	(72-012A-06)	JUDGE	R	0.000E-02 TO 2.000E-02 MIC		H	5	103
ULTRAVIOLET PHOTOMETRY.....								
PIONEER 11	(73-019A-06)	JUDGE	R	0.000E-02 TO 2.000E-02 MIC		H	5	105
ULTRAVIOLET PHOTOMETRY.....								

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID EXPERIMENT TITLE	EXPERIMENTER	RANGE OF MIN VALUE * MAX VALUE	MEASUREMENTS (F OR E) (WAVELENGTH)	REGION MAX ALTITUDE/012345M MIN	PLANET 6709	PAGE
1.3.5 SENSING COLD (PLANETARY) SOURCES							
MARINER 10	(73-085A-02)	HOWARD					
5- AND X-BAND RADIO PROPAGATION.....			R				
PIONEER VENUS PROBE SM1 (PI078PC-04)	SUOMI				H 12	76	
INFRARED RADIOMETER.....			A				
PIONEER VENUS PROBE SM2 (PI078PD-04)	SUOMI				2	114	
INFRARED RADIOMETER.....			A				
PIONEER VENUS PROBE SM3 (PI078PE-04)	SUOMI				2	114	
INFRARED RADIOMETER.....			A				
PIONEER VENUS PROBE SM2 (PI078PD-03)	PETTENGILL				2	115	
DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING.....			R				
PIONEER VENUS PROBE SM3 (PI078PE-03)	PETTENGILL				2	114	
DIFFERENTIAL VERY-LONG-BASELINE INTERFEROMETRIC TRACKING.....			R				
HJS 77A	(HARN77A-11)	LILLIE			2	115	
MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A.....			R				
HJS 77B	(HARN77B-11)	LILLIE			6 5	78	
MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A.....			R				
HJS 77A	(HARN77A-11)	LILLIE			6 5	81	
MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A.....			R				
HJS 77D	(HARN77D-11)	LILLIE			6 5	78	
MULTIFILTER PHOTOPOLARIMETER, 2200-7300 A.....			R				
HJS 77A	(HARN77A-02)	ESHELMAN			6 5	81	
RADIO SCIENCE TEAM.....			R				
HJS 77A	(HARN77A-10)	WARWICK			6 5	78	
PLANETARY RADIO ASTRONOMY.....			R 2.000E 04 TO 4.050E 07 HZ		6 5	79	
HJS 77B	(HARN77B-10)	WARWICK					
PLANETARY RADIO ASTRONOMY.....			R 2.000E 04 TO 4.050E 07 HZ		6 5	82	
HJS 77B	(HARN77B-02)	ESHELMAN					
RADIO SCIENCE TEAM.....			R 1.000E 09 TO 1.000E 10 HZ		6 5	80	
TIROS-H	(TIOS-H-02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS).....			R 5.455E 10 TO 5.455E 10 HZ A		3	71	
TIROS-I	(TIOS-I-02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS).....			R 5.455E 10 TO 5.455E 10 HZ A		3	72	
TIROS-J	(TIOS-J-02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS).....			R 5.455E 10 TO 5.455E 10 HZ A		3	73	
TIROS-N	(TIOS-N-02)	NESS STAFF					
TIROS OPERATIONAL VERTICAL SOUNDER (TOVS).....			R 5.455E 10 TO 5.455E 10 HZ A		3	137	
MARINER 10	(73-085A-06)	CHASE, JR.					
TWO-CHANNEL IR RADIOMETER.....			R 3.900E 01 TO 2.200E 01 MIC		12	76	
NIMBUS 4	(70-025A-05)	HEATH					
BACKSCATTER ULTRAVIOLET (BUV) SPECTROMETER.....			R 1.500E 01 TO 1.450E 01 MIC A		3	83	
ERTS-B	(ERTS-B-02)	ARLUSKAS					
MULTISPECTRAL SCANNER (MSS).....			R 1.260E 01 TO 1.040E 01 MIC A		3	34	
GOES-0	(GOES-0-01)	NESS STAFF					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 1.250E 01 TO 1.050E 01 MIC A		3	39	
GOES-C	(GOES-C-01)	NESS STAFF					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 1.250E 01 TO 1.050E 01 MIC A		3	40	
PIONEER 11	(73-019A-08)	MUNCH					
INFRARED RADIOMETER.....			R 2.500E 00 TO 1.400E 00 MIC		5	106	
SMS-A	(74-033A-01)	NESS STAFF					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 1.290E 00 TO 2.500E-01 MIC A		3	123	
PIONEER VENUS PROBE LRG (PI078PD-07)	TONASKO						
SOLAR ENERGY PENETRATION INTO THE ATMOSPHERE.....			R 0.000E-01 TO 3.000E-01 MIC		2	113	
SMS-A	(74-033A-01)	NESS STAFF					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 7.500E-01 TO 5.500E-01 MIC A		3	123	
SMS-B	(SMS-B-04)	NESS STAFF					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 7.500E-01 TO 5.500E-01 MIC A		3	124	
SMS-C	(SMS-C-01)	NESS STAFF					
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISSR).....			R 7.500E-01 TO 5.500E-01 MIC A		3	125	
NOAA 2	(72-002A-02)	NESS STAFF					
SCANNING RADIOMETER (SR).....			R 7.300E-01 TO 5.200E-01 MIC A		3	90	
NOAA 7	(73-006A-02)	NESS STAFF					
SCANNING RADIOMETER (SR).....			R 7.300E-01 TO 5.200E-01 MIC A		3	90	
NOAA 3	(73-006A-03)	NESS STAFF					
VERY HIGH RESOLUTION RADIOMETER (VHRR).....			R 7.300E-01 TO 5.200E-01 MIC A		3	91	
NOAA 4	(TIOS-C-02)	NESS STAFF					
SCANNING RADIOMETER (SR).....			R 7.300E-01 TO 5.200E-01 MIC A		3	91	
NOAA 4	(TIOS-C-03)	NESS STAFF					
VERY HIGH RESOLUTION RADIOMETER (VHRR).....			R 7.300E-01 TO 5.200E-01 MIC A		3	91	
TIROS-H	(TIOS-H-01)	NESS STAFF					
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....			R 7.000E-01 TO 5.000E-01 MIC A		3	71	
TIROS-I	(TIOS-I-01)	NESS STAFF					
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....			R 7.000E-01 TO 5.000E-01 MIC A		3	72	
TIROS-J	(TIOS-J-01)	NESS STAFF					
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....			R 7.000E-01 TO 5.000E-01 MIC A		3	73	
TIROS-N	(TIOS-N-01)	NESS STAFF					
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....			R 7.000E-01 TO 5.000E-01 MIC A		3	137	

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			MIN VALUE	MAX VALUE (F UP E) (LAMBDA) MIN		
1.3.5 SENSING COLD (PLANETARY) SOURCES						
PIONEER VENUS ORBITER (PI0780R-15) STEWART			R 3.400E-01	TO 1.100E-01 MIC	2	109
PROGRAMMABLE ULTRAVIOLET SPECTROMETER.....						
IUL (SAS-D -01) NONE ASSIGNED						
LOW/HIGH RESOLUTION ULTRAVIOLET			R 3.255E-01	TO 1.135E-01 MIC	I 5	74
SPECTROGRAPH PACKAGE.....						
OSO-1 (OS0-I -08) WELLER, JR.			R 1.230E-01	TO 1.500E-02 MIC A	0 3	95
EUV FROM EARTH AND SPACE.....						
PIONEER 10 (72-012A-06) JUDGE						
ULTRAVIOLET PHOTOMETRY.....			R 8.000E-02	TO 2.000E-02 MIC	H 5	103
PIONEER 11 (73-019A-06) JUDGE			R 8.000E-02	TO 2.000E-02 MIC	H 5	105
ULTRAVIOLET PHOTOMETRY.....						
RH 20 (R420 -04) PEPIN						
STRATOSPHERIC AEROSOL PROFILE			R		A C 3	116
OBSERVATIONS NEAR SUNRISE/SET.....						
RH 20 (R420 -04) PEPIN						
STRATOSPHERIC AEROSOL PROFILE			R		A C 3	116
OBSERVATIONS NEAR SUNRISE/SET.....						
1.3.6 SENSING THE SUN						
OSO 5 (69-006A-01) BOYD			R		0	93
X RAY SPECTROMELIOGRAPH.....						
ISEE-C (HELOCTR-10) STEINBERG			R 2.000E 04	TO 3.000E 06 HZ	0	65
20-KHZ TO 3-MHZ RADIO MAPPING.....						
RAE-D (73-030A-01) STONE			R 3.000E 04	TO 2.000E 07 HZ	I 0	116
STEP FREQUENCY RADIOMETERS.....						
INP-1 (71-019A-13) HADDOCK						
INTERPLANETARY LONG-WAVELENGTH RADIO			R 5.000E 04	TO 3.500E 06 HZ	0	54
ASTRONOMY EXPERIMENT.....						
ALDUTTE 2 (65-098A-03) HARTZ			R 1.000E 05	TO 1.500E 07 HZ	I 0	19
COSMIC RADIO NOISE.....						
ISIS 1 (69-009A-10) HARTZ			R 1.000E 05	TO 2.000E 07 HZ	I 0	67
COSMIC RADIO NOISE.....						
ISIS 2 (71-024A-10) HARTZ			R 1.000E 05	TO 2.000E 07 HZ	I 0	69
COSMIC RADIO NOISE.....						
OSO-1 (OS0-I -02) BONNETT			R 4.000E 03	TO 1.000E 03 A	0	94
CHROMOSPHERE FINE STRUCTURE STUDY.....						
OSO-1 (OS0-I -01) BRUNER, JR.						
HIGH RESOLUTION ULTRAVIOLET SPECTROMETER			R 2.200E 03	TO 1.050E 03 A	0	94
MEASUREMENTS.....						
AE-C (73-101A-06) HINTEREGGER			R 1.850E 03	TO 1.420E 02 A	0	9
SOLAR EUV SPECTROPHOTOMETER.....						
AE-D (AF-D -06) HINTEREGGER			R 1.850E 03	TO 1.420E 02 A	0	12
SOLAR EUV SPECTROPHOTOMETER.....						
AE-E (AE-E -06) HINTEREGGER			R 1.850E 03	TO 1.420E 02 A	0	16
SOLAR EUV SPECTROPHOTOMETER.....						
SESP 73-5 (ST73-5A-04) PRAG			R 1.000E 03	TO 1.400E 03 A	0	121
SOLAR UV EXPERIMENT.....						
SOLRAD 11A (SRD-11A-09) FELDMAN			R 1.000E 03	TO 1.175E 03 A	0	128
1175- TO 1800-A SOLAR UV SPECTROMETER.....						
SOLRAD 11B (SRD-11B-09) FELDMAN			R 1.000E 03	TO 1.175E 03 A	0	131
1175- TO 1800-A SOLAR UV SPECTROMETER.....						
SOLRAD 10 (71-090A-01) KREPLIN			R 1.600E 03	TO 8.000E-02 A	0	126
SOLAR RADIATION DETECTORS.....						
SOLRAD 11A (SRD-11A-08) KREPLIN			R 1.350E 03	TO 1.080E 03 A	0	129
1080- TO 1350-A SOLAR UV MONITOR.....						
SOLRAD 11B (SRD-11B-08) KREPLIN			R 1.350E 03	TO 1.080E 03 A	0	133
1080- TO 1350-A SOLAR UV MONITOR.....						
SOLRAD 9 (SRD-017A-01) KREPLIN			R 1.390E 03	TO 1.000E 03 A	0	126
SOLAR RADIATION DETECTORS.....						
OSO-1 (OS0-I -08) WELLER, JR.			R 1.230E 03	TO 1.500E 02 A A	0 3	95
EUV FROM EARTH AND SPACE.....						
AE-E (AE-E -05) HEATH			R 1.216E 03	TO 4.500E 01 A	0	16
SOLAR EUV FILTER PHOTOMETER.....						
AE-C (73-101A-05) HEATH			R 1.216E 03	TO 4.500E 01 A	0	9
SOLAR EUV FILTER PHOTOMETER.....						
AEROS 2 (74-055A-04) SCHMIDTKE						
FLUX AND SPECTRAL DISTRIBUTION OF SOLAR			R 1.070E 03	TO 3.000E 02 A	0	18
EUV RAD AND THEIR TEMP AND SPATIAL VAR.....						
SOLRAD 11A (SRD-11A-07) KREPLIN			R 1.050E 03	TO 1.700E 02 A	0	129
170- TO 1950-A SOLAR EUV MONITOR.....						
SOLRAD 11B (SRD-11B-07) KREPLIN			R 1.050E 03	TO 1.700E 02 A	0	132
170- TO 1950-A SOLAR EUV MONITOR.....						
SESP 73-5 (ST73-5A-04) PRAG			R 1.000E 03	TO 3.000E 02 A	0	121
SOLAR UV EXPERIMENT.....						
AEROS 2 (74-055A-04) SCHMIDTKE						
FLUX AND SPECTRAL DISTRIBUTION OF SOLAR			R 5.100E 02	TO 1.500E 02 A	0	18
EUV RAD AND THEIR TEMP AND SPATIAL VAR.....						
SOLRAD 11A (SRD-11A-06) KREPLIN			R 6.000E 01	TO 4.400E 01 A	0	129
44- TO 60-A SOLAR X-RAY MONITOR.....						
SOLRAD 11B (SRD-11B-06) KREPLIN			R 6.000E 01	TO 4.400E 01 A	0	132
44- TO 60-A SOLAR X-RAY MONITOR.....						
SOLRAD 9 (SRD-017A-01) KREPLIN			R 6.000E 01	TO 5.000E-01 A	0	126
SOLAR RADIATION DETECTORS.....						
VELA 5A (69-046D-02) CHAMBERS			R 6.000E 01	TO 5.000E-01 A	0	139
SOLAR X-RAY DETECTORS, 0.5 TO 3.0 A.						
1 TO 8 A, 1 TO 16 A, 44 TO 60 A.....						
VELA 6A (70-027A-02) CHAMBERS			R 6.000E 01	TO 5.000E-01 A	0	141
SOLAR X-RAY DETECTORS, 0.5 TO 3.0 A.						
1 TO 8 A, 1 TO 16 A, 44 TO 60 A.....						
SOLRAD 11A (SRD-11A-13) KREPLIN			R 2.000E 01	TO 1.000E 00 A	0	129
1- TO 20-A SOLAR X-RAY MONITOR.....						

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			MIN VALUE * MAX VALUE	(F OR E) (LAMDA)			
1-3-6 SENSING THE SUN							
SOLRAD 110	(SRD-110-13)	KREPLIN					
1- TO 20-A SOLAR X-RAY MONITOR.....			R 2.000E 01 TO 1.000E 00 A		0		133
IMP-H	(72-073A-00)	KRIMIGIS					
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....			P 1.650E 01 TO 1.800E 00 A		1 0		91
IMP-J	(73-078A-00)	KRIMIGIS					
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....			R 1.650E 01 TO 1.800E 00 A		1 0		96
SOLRAD 11A	(SRD-11A-05)	KREPLIN					
8- TO 16-A SOLAR X-RAY MONITOR.....			R 1.600E 01 TO 8.000E 00 A		0		129
SOLRAD 110	(SRD-11B-05)	KREPLIN					
8- TO 16-A SOLAR X-RAY MONITOR.....			R 1.600E 01 TO 8.000E 00 A		0		132
OVS-6	(69-046B-01)	YATES					
GEIGER-MUELLER TUBF. SOLAR X-RAY DETECTOR, 2 TO 12 A.....			R 1.200E 01 TO 2.000E 00 A		0		95
SOLRAD 11A	(SRD-11A-03)	WEEKINS					
CONTINUUM (8.8 A) AND MAGNESIUM LINE (9.17 A AND 8.42 A) MONITOR.....			R 9.170E 00 TO 8.420E 00 A		0		129
SOLRAD 110	(SRD-110-03)	WEEKINS					
CONTINUUM (8.8 A) AND MAGNESIUM LINE (9.17 A AND 8.42 A) MONITOR.....			R 9.170E 00 TO 8.420E 00 A		0		133
QSO 5	(69-006A-01)	DOYD					
X RAY SPECTROHELIOGRAPH.....			R 9.000E 00 TO 3.000E 00 A		0		93
SOLRAD 11A	(SRD-11A-04)	KREPLIN					
1- TO 8-A SOLAR X-RAY MONITOR.....			R 8.000E 00 TO 1.000E 00 A		0		128
SOLRAD 110	(SRD-11B-04)	KREPLIN					
1- TO 8-A SOLAR X-RAY MONITOR.....			R 8.000E 00 TO 1.000E 00 A		0		132
SMS-A	(74-033A-03)	WILLIAMS					
SOLAR X-RAY MONITOR.....			R 8.000E 00 TO 5.000E-01 A		0		123
GOES-B	(GOES-B -03)	WILLIAMS					
SOLAR X-RAY MONITOR.....			R 8.000E 00 TO 5.000E-01 A		0		40
GOES-C	(GOES-C -03)	WILLIAMS					
SOLAR X-RAY MONITOR.....			R 8.000E 00 TO 5.000E-01 A		0		41
SMS-D	(SMS-D -02)	WILLIAMS					
SOLAR X-RAY MONITOR.....			R 8.000E 00 TO 5.000E-01 A		0		124
SMS-C	(SMS-C -03)	WILLIAMS					
SOLAR X-RAY MONITOR.....			R 8.000E 00 TO 5.000E-01 A		0		125
QSO-1	(QSO-1 -03)	NDVICK					
HIGH-SENSITIVITY GRAPHITE CRYSTAL SPECTROSCOPY OF STELLAR AND SOLAR X RAYS.....			R 6.204E 00 TO 1.551E 00 A		1 0		95
HELIOS-B	(HELI0-B-08)	TRAINOR					
GALACTIC AND SOLAR COSMIC RAYS.....			R 6.204E 00 TO 1.551E 00 A		0		49
HELIOS-A	(HELI0-A-08)	TRAINOR					
GALACTIC AND SOLAR COSMIC RAYS.....			R 6.204E 00 TO 1.551E 00 A		0		47
QSO-1	(QSO-1 -04)	ACTON					
MAPPING X-RAY HELIOMETER.....			R 6.204E 00 TO 4.136E-01 A		0		94
SOLRAD 11A	(SRD-11A-10)	DOSCHER					
THOMSON X-RAY POLARIMETER.....			R 6.204E 00 TO 2.482E-01 A		0		128
SOLRAD 110	(SRD-11B-10)	DOSCHER					
THOMSON X-RAY POLARIMETER.....			R 6.204E 00 TO 2.482E-01 A		0		131
SOLRAD 11A	(SRD-11A-02)	SMATHERS					
X-RAY MONITOR (0.1-1.6 A, 0.6-3 A, 1-4 A).....			R 3.102E 00 TO 1.241E-01 A		0		130
SOLRAD 110	(SRD-110-02)	SMATHERS					
X-RAY MONITOR (0.1-1.6 A, 0.6-3 A, 1-4 A).....			R 3.102E 00 TO 1.241E-01 A		0		133
SOLRAD 11A	(SRD-11A-12)	KREPLIN					
0.5- TO 3-A SOLAR X-RAY MONITOR.....			R 3.000E 00 TO 5.000E-01 A		0		129
SOLRAD 110	(SRD-110-12)	KREPLIN					
0.6- TO 3-A SOLAR X-RAY MONITOR.....			R 3.000E 00 TO 5.000E-01 A		0		133
SOLRAD 11A	(SRD-11A-11)	WEEKINS					
BRAGG X-RAY POLARIMETER.....			R 2.800E 00 TO 2.800E 00 A		0		130
SOLRAD 110	(SRD-110-11)	WEEKINS					
BRAGG X-RAY POLARIMETER.....			R 2.800E 00 TO 2.800E 00 A		0		133
1SEE-C	(HELOCTR-09)	ANDERSON					
X RAYS AND ELECTRONS.....			R 1.551E 00 TO 1.723E-01 A		0		63
SOLRAD 11A	(SRD-11A-01)	FRITZ					
15- TO 150-KEV SOLAR X-RAY MONITOR.....			R 8.272E-01 TO 8.272E-02 A		0		120
SOLRAD 110	(SRD-11B-01)	FRITZ					
15- TO 150-KEV SOLAR X-RAY MONITOR.....			R 8.272E-01 TO 8.272E-02 A		0		131
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SODIUM IODIDE SCINTILLATOR, GAMMA-RAY DETECTOR, 19 TO 1175 KEV.....			R 6.531E-01 TO INFINITY		0		95
SOLRAD 9	(60-017A-01)	KREPLIN					
SOLAR RADIATION DETECTORS.....			R 6.204E-01 TO 1.551E-01 A		0		126
TD 1A	(72-014A-06)	DE JAGER					
SOLAR X-RAY MONITOR.....			R 5.170E-01 TO 1.379E-02 A		0		135
INDIAN SCIENTIFIC SAT. (INDASAT-02) DANIEL			R 6.204E-02 TO 6.204E-04 A		0		97
SOLAR NEUTRON AND GAMMA RAYS.....							
TD 1A	(72-014A-07)	LABEYRIE					
GAMMA-RAY MEASUREMENT.....			R 7.000E 01 TO 3.000E 02 MEV		1 0		136
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SOLAR X-RAY MONITOR.....			R		0		139
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1.3.7 SENSING HOT (STAR) SOURCES							
SAS-C	(SAS-C -04) CLARK			R 6.204E 01	TO 1.241E 00 A		120
X-RAY ABSORPTION CONTOURS OF THE GALAXY.....							
HEAD-A	(HEAD-A -02) BOLDT			R 6.204E 01	TO 2.068E-01 A		43
COSMIC X-RAY EXPERIMENT.....							
CORSA	(CORSA -01) HAYAKAWA			R 4.963E 01	TO 2.068E-01 A		30
COSMIC X-RAY DETECTION (0.25 - 60 KEV).....							
UK 5	(74-077A-01) NOVO						
0.3- TO 30-KEV COSMIC X RAY WITH A.....							
	ROTATION COLLIMATOR.....			R 4.136E 01	TO 4.136E-01 A		137
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CONTINUOUS X-RAY FLUCTUATION MONITOR OF.....							
SCORPIO X-1.....	(SAS-C -03) CLARK			R 3.102E 01	TO 1.551E-01 A		120
SAS-C	(SAS-C -03) CLARK						
CONTINUOUS X-RAY FLUCTUATION MONITOR OF.....							
SCORPIO X-1.....	(SAS-C -03) CLARK			R 3.102E 01	TO 1.551E-01 A		120
HEAD-B	(HEAD-B -05) BOLDT			R 2.402E 01	TO 3.102E 00 A		44
SOLID-STATE X-RAY DETECTOR.....							
SOLRAD 11A	(SRD-11A-24) FRITZ			R 2.402E 01	TO 6.204E-01 A		120
X-RAY BACKGROUND.....							
SOLRAD 11B	(SRD-11B-24) FRITZ			R 2.402E 01	TO 6.204E-01 A		132
X-RAY BACKGROUND.....							
IMP-H	(72-073A-08) KRINIGIS			R 1.650E 01	TO 1.800E 00 A		51
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....							
IMP-J	(71-078A-08) KRINIGIS						
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....							
	(70-107A-01) GIACCONI			R 1.241E 01	TO 1.241E 00 A		119
SAS-A	(70-107A-01) GIACCONI			R 1.241E 01	TO 6.204E-01 A		119
SAS-A	(69-046F-06) CONNER			R 1.200E 01	TO 1.200E 01 A		140
VELA 5B	(71-058A-02) KREPLIN			R 1.200E 01	TO 5.000E-01 A		127
COSMIC X RAYS.....							
SOLRAD 10	(SAS-C -01) CLARK			R 8.272E 00	TO 1.241E 00 A		119
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SAS-C	(SAS-C -01) CLARK			R 8.272E 00	TO 1.241E 00 A		119
ANALYSIS OF EXTRAGALACTIC X-RAY SOURCES.....							
SAS-C	(74-077A-02) POUNDS			R 8.272E 00	TO 6.204E-01 A		138
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SOLRAD 11A	(SRD-11B-16) BYRAM			R 8.000E 00	TO 1.000E 00 A		131
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SOLRAD 11B	(SAS-C -02) CLARK			R 6.893E 00	TO 1.551E 00 A		119
STELLAR/AURORAL X RAYS.....							
SAS-C	(74-077A-04) POUNDS			R 6.204E 00	TO 1.551E 00 A		138
ANALYSIS OF GALACTIC X-RAY SOURCES.....							
UK 5	(OSO-1 -03) NOVICK						
POLARIMETER/SPECTROMETER.....							
OSO-1	(73-039A-01) STONE			R 6.204E 00	TO 1.551E 00 A		95
HIGH-SENSITIVITY GRAPHITE CRYSTAL SPECTROSCOPY OF STELLAR AND SOLAR X RAYS.....							
RAE-B	(65-098A-03) HARTZ			R 3.000E 04	TO 2.300E 07 HZ		116
STEP FREQUENCY RADIO METERS.....							
ALOUETTE 2	(69-009A-10) HARTZ			R 1.000E 05	TO 1.500E 07 HZ		19
COSMIC RADIO NOISE.....							
ISIS 1	(71-024A-10) HARTZ			R 1.000E 05	TO 2.000E 07 HZ		67
COSMIC RADIO NOISE.....							
ISIS 2	(74-070A-01) VANDUINEN			R 1.000E 05	TO 2.000E 07 HZ		69
COSMIC RADIO NOISE.....							
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TUE							
LOW/HIGH RESOLUTION, ULTRAVIOLET SPECTROGRAPH PACKAGE.....							
TO 1A	(72-014A-01) MONFELS			R 3.255E 03	TO 1.135E 03 A		74
STELLAR UV RADIATION EXPERIMENT.....							
TO 1A	(72-014A-02) KAMPERMAN			R 2.750E 03	TO 1.350E 03 A		136
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GEOCORONAL-EXTRATERRESTRIAL EUV - DETECTOR 1.....							
SOLRAD 11A	(SRD-11A-19) WELLER, JR.			R 1.400E 03	TO 2.000E 02 A		130
GEOCORONAL-EXTRATERRESTRIAL EUV - DETECTOR 2.....							
SOLRAD 11B	(SRD-11B-18) WELLER, JR.			R 1.400E 03	TO 2.000E 02 A		130
GEOCORONAL-EXTRATERRESTRIAL EUV - DETECTOR 1.....							
SOLRAD 11B	(SRD-11B-19) WELLER, JR.			R 1.400E 03	TO 2.000E 02 A		133
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SOLRAD 11B	(72-065A-01) SPITZER			R 1.400E 03	TO 2.000E 02 A		134
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DAO 3	(ASTP -02) BOWYER			R 3.275E 02	TO 7.100E 02 A		92
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ASTP	(ASTP -04) FRIEDMAN			R 3.040E 02	TO 3.040E 02 A		26
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HEAD-B	(HEAD-C -03) CLARK			R 1.241E 02	TO 3.102E 00 A		44
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HEAD-B							
HEAD-A	(HEAD-A -01) FRIEDMAN			R 1.034E 02	TO 4.136E 00 A		44
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HEAD-A				R 8.272E 01	TO 6.204E-01 A		43
LARGE AREA COSMIC X-RAY SURVEY.....							

SATELLITE NAME	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS	REGION	PLANET
DESCRIPTIVE EXPERIMENT TITLE	MIN VALUE	(F OR E)	MAX	ABCOEFGHI	0123456
	MAX VALUE	(LAMODA)	MIN	6789	PAGE
1.3.7 SENSING HWT (STAR) SOURCES					
OSO-I (OSO-I -05) KRAUSHAAR					
SOFT X-RAY BACKGROUND RADIATION					
INVESTIGATION.....	R 8.272E 01	TO 2.757E-01 A		1	94
DAO 3 (72-065A-02) BOYD					
STELLAR PHOTOMETRY.....	R 7.000E 01	TO 1.000E 00 A		1	92
HEAD-B (HEAD-B -02) GIACCONI					
HIGH RESOLUTION IMAGER.....	R 6.204E 01	TO 3.102E 00 A		1	44
HEAD-B (HEAD-B -01) GIACCONI					
MONITOR PROPORTIONAL COUNTER.....	R 6.204E 01	TO 1.241E 00 A		1	44
UK 5 (74-077A-03) BOYD					
HIGH RESOLUTION SOURCE SPECTRA.....	R 6.204E 00	TO 4.136E-01 A		1	130
ANS (74-070A-03) GURSKY					
HIGH ANGULAR AND SPECTRAL RESOLUTION					
OBSERVATIONS OF COSMIC X-RAY SOURCES.....	R 6.204E 00	TO 3.102E-01 A		1	20
OSO-I (OSO-I -06) HOLDT					
COSMIC X-RAY SPECTROSCOPY.....	R 6.204E 00	TO 3.102E-01 A		1	94
INDIAN SCIENTIFIC SAT. (INDASAT-01) RAO					
X-RAY ASTRONOMY.....	R 6.204E 00	TO 1.241E-01 A		1	57
UK 5 (74-077A-06) HOLDT					
ALL-SKY MONITOR.....	R 4.136E 00	TO 2.068E 00 A		1	130
TD 1A (72-014A-04) LABEYRIE					
SPECTROMETRY OF EXTRATERRESTRIAL X RAYS.....	R 4.136E 00	TO 4.136E-01 A		1	136
ANS (74-070A-02) BRINKMAN					
LOW-ENERGY X-RAY EXPERIMENT.....	R 4.000E 00	TO 2.000E 00 A		1	20
OSO-I (OSO-I -07) FROST					
HIGH-ENERGY CELESTIAL X RAYS.....	R 1.241E 00	TO 1.241E-02 A		1	94
HEAD-A (HEAD-A -04) PETERSON					
LOW-ENERGY GAMMA-RAY AND HARD X-RAY SKY					
SURVEY.....	R 1.241E 00	TO 1.241E-03 A		1	43
UK 5 (74-077A-05) ELLIOT					
HIGH-ENERGY COSMIC X-RAY SPECTRA.....	R 6.204E-01	TO 6.204E-03 A		1	138
HEAD-C (HEAD-C -01) JACOBSON					
GAMMA-RAY LINE SPECTROMETER.....	R 2.068E-01	TO 1.241E-03 A		1	45
VELA 5A (69-046D-08) KLEBESADEL					
GAMMA-RAY ASTRONOMY.....	R 6.204E-02	TO 1.241E-02 A		1	139
PIONEER VENUS ORBITER (PI0780R-05) EVANS					
TRANSIENT GAMMA-RAY SOURCES.....	R 6.204E-02	TO 6.204E-03 A		1	108
VELA 6A (70-027A-08) KLEBESADEL					
GAMMA-RAY ASTRONOMY.....	R 4.136E-02	TO 8.272E-03 A		1	141
VELA 6B (70-027B-08) KLEBESADEL					
GAMMA-RAY ASTRONOMY.....	R 4.136E-02	TO 8.272E-03 A		1	142
TD 1A (72-014A-05) OCCHIALINI					
SOLAR GAMMA RAYS IN THE 50- TO 500-MEV					
ENERGY RANGE.....	R 5.000E 01	TO 5.000E 02 MEV		1	136
TD 1A (72-014A-07) LABEYRIE					
GAMMA-RAY MEASUREMENT.....	R 7.000E 01	TO 3.000E 02 MEV		1 0	136
ASTP (ASTP -01) DOWDY					
EXTREME ULTRAVIOLET ASTRONOMY.....	R			1	26
EXOS-C (EXOS-C -01) UNKNOWN					
X-RAY AND GAMMA-RAY ASTRONOMICAL					
TELESCOPES.....	R			1	37
EXOS-C (EXOS-C -02) UNKNOWN					
ULTRAVIOLET TELESCOPE.....	R			1	37
EXOS-C (EXOS-C -03) UNKNOWN					
INFAIRED TELESCOPE.....	R			1	37
HEAD-A (HEAD-A -03) GURSKY					
X-RAY SCANNING MODULATION COLLIMATOR.....	R			1	43
HEAD-A (HEAD-A -03) GURSKY					
X-RAY SCANNING MODULATION COLLIMATOR.....	R			1	43

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS		REGION	PLANET	PAGE
			E MIN VALUE	(F OR E)			
			S MAX VALUE	(LA4B3A)	MIN	ABCEFGHIJ123456	
2. CHARGED PARTICLE MEASUREMENTS							
2.1 SENSING ELECTRONS							
2.1.1 THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)							
PIONEER 6	(65-105A-04)	ESHLEMAN	R THERMAL ENERGIES		B	H 0	96
TWO-FREQUENCY RADIO RECEIVER	(66-075A-03)	WOLFF	R THERMAL ENERGIES			H	98
PIONEER 7	(67-123A-03)	ESHLEMAN	R THERMAL ENERGIES		B	H	99
ELECTROSTATIC ANALYZER	(68-100A-03)	ESHLEMAN	R THERMAL ENERGIES		B	H	100
PIONEER 9	(69-009A-02)	CALVERT	R THERMAL ENERGIES		C		66
TWO-FREQUENCY BEACON RECEIVER	(71-024A-01)	WHITTAKER	R THERMAL ENERGIES		C		70
ISIS 1	(71-024A-02)	CALVERT	R THERMAL ENERGIES		C		60
FIXED FREQUENCY SOUNDER	(71-024A-07)	GRACE	R THERMAL ENERGIES		C		60
ISIS 2	(73-082A-05)	UNKNOWN	R THERMAL ENERGIES		C		50
CYLINDRICAL ELECTROSTATIC PROBE	(73-101A-01)	GRACE	R THERMAL ENERGIES		C		8
INTERCOSMOS 10	(73-101A-04)	HANSON	R THERMAL ENERGIES		C		9
ELECTRON CONCENTRATION AND TEMPERATURE	(74-055A-03)	NESKE	R THERMAL ENERGIES		C		10
AE-C	(AE-D -04)	HANSON	R THERMAL ENERGIES		C		12
ELECTRON TEMPERATURE AND CONCENTRATION	(AE-E -01)	GRACE	R THERMAL ENERGIES		B		15
AE-C	(AE-E -04)	HANSON	R THERMAL ENERGIES		B		15
ION TEMPERATURE	(DAUGHTER-06)	HARVEY	R THERMAL ENERGIES		EEFGH		62
AEROS 2	(ESGEO -02)	BOYD	R		F		34
ELECTRON CONCENTRATION IN THE IONOSPHERE	(EXOS-A -02)	UNKNOWN	U		BC		36
AE-D	(INTASAT-71)	UNKNOWN	R THERMAL ENERGIES		C		58
ION TEMPERATURE	(ISS -01)	UNKNOWN	R THERMAL ENERGIES		C		70
ISS	(ISS -03)	MIYAZAKI	R THERMAL ENERGIES		B		70
ISS	(MOTHER -08)	HARVEY	R THERMAL ENERGIES		EEFGH		60
ISS	(PIOTROR-01)	GRACE	R			2	107
ACTIVE PLASMA EXPERIMENT	(PIOTROR-07)	KNUDSEN	R			2	108
PIONEER VENUS ORBITER	(SRATS -04)	OHYA	R		B		135
RETARDING POTENTIAL PROBE	(SRATS -05)	MIRAO	R		B		135
SRATS	(SRATS -06)	MIYAZAKI	R		D		135
ELECTRON DENSITY MEASUREMENT	(ST73-5A-05)	PRAG	R		C		121
SRATS	(ST73-5A-06)	PRAG	R		C		121
SRATS	(ST73-6A-09)	SMIDDY	R		C		117
SRATS	(ST73-6A-12)	WILDMAN	R		C		118
SRATS	(VIK-AL-12)	NIER	R THERMAL ENERGIES			4	144
SRATS	(69-009A-09)	FORSYTH	R THERMAL ENERGIES		C		66
SRATS	(71-024A-09)	FORSYTH	R THERMAL ENERGIES		C		69
SRATS	(74-039A-70)	DAVIES	R THERMAL ENERGIES		B	4	29
SRATS	(74-055A-02)	SPENNER	R THERMAL ENERGIES		C		19
SRATS	(AE-D -01)	GRACE	R THERMAL ENERGIES		C		11
SRATS	(INDASAT-03)	SATYAPRAKASH	R THERMAL ENERGIES		B		57
SRATS	(MARN77B-02)	ESHLEMAN	R THERMAL ENERGIES			6 5	80
SRATS	(74-039A-09)	DAVIES	R		B		29
SRATS	(EXOS-A -01)	UNKNOWN	R THERMAL ENERGIES		C		36
SRATS	(EXOS-D -01)	UNKNOWN	R THERMAL ENERGIES		DE		37
SRATS	(MARN77A-02)	ESHLEMAN	R			6 5	78
SRATS	(PIOTROR-03)	CROFT	N			2	107
SRATS	(VIK-OL-12)	NIER	R THERMAL ENERGIES			4	147
SRATS	(71-082A-03)	UNKNOWN	R 5.000E-01 TO 5.000E 03 EV		C		50
SRATS	(74-042A-02)	FRANK					

SATELLITE NAME	EXPERIMENT ID	EXPERIMENTER	R RANGE OF MEASUREMENTS REGION	PLANET
DESCRIPTIVE EXPERIMENT TITLE	E MIN VALUE (F OR F)	MAX ABCEFGHIJ123456	6709	PAGE
	S MAX VALUE (LANDDA)	MIN		
2.1.1 THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)				
LOW-ENERGY PROTONS AND ELECTRONS.....	R 1.000E 00 TO 1.000E 03 EV	DEFG		47
ISEE-B (DAUGHTER-03) FRANK	R 1.000E 00 TO 1.000E 03 EV	GH		62
HOT PLASMA.....	R 1.000E 00 TO 1.000E 03 EV	GH		59
ISEE-A (MOTHER-03) FRANK	R 1.000E 00 TO 1.000E 03 EV		2	110
HOT PLASMA.....	R 1.000E 00 TO 1.000E 03 EV	GH		59
PIONEER VENUS ORBITER (PIOT00P-10) WOLFF	R 1.000E 00 TO 5.000E 02 EV			
SOLAR WIND PLASMA DETECTOR.....	R 1.000E 00 TO 1.000E 03 EV	GH		59
ISEE-A (MOTHER-03) FRANK	R 1.000E 00 TO 1.000E 03 EV			
HOT PLASMA.....	R 1.000E 00 TO 1.000E 03 EV	GH		59
AE-C (73-101A-03) ODERING	R 2.000E 00 TO 5.000E 02 EV	C		8
PHOTOELECTRON SPECTROMETER.....	R 2.000E 00 TO 5.000E 02 EV	C		12
AE-D (AE-D-03) ODERING	R 2.000E 00 TO 5.000E 02 EV			
PHOTOELECTRON SPECTROMETER.....	R 2.000E 00 TO 5.000E 02 EV	H		15
AE-E (AE-E-03) ODERING	R 2.000E 00 TO 5.000E 02 EV			
PHOTOELECTRON SPECTROMETER.....	R 2.000E 00 TO 5.000E 02 EV	H		75
MAHNER 10 (73-085A-03) BRIDGE	R 4.000E 00 TO 4.000E 02 EV			
MEASUREMENT OF PLASMA ENVIRONMENT.....	R 4.000E 00 TO 1.000E 03 EV	DEFGH		51
IMP-I (71-019A-11) BAME	R 4.000E 00 TO 1.000E 03 EV			
MEASUREMENT OF SOLAR PLASMA.....	R 5.000E 00 TO 1.000E 03 EV	GH		51
IMP-H (72-073A-04) FRANK	R 5.000E 00 TO 1.000E 03 EV			
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....	R 5.000E 00 TO 5.000E 04 EV	GH		55
IMP-J (73-070A-04) FRANK	R 5.000E 00 TO 5.000E 04 EV	GH		55
MEASUREMENT OF SOLAR PLASMA.....	R 5.000E 00 TO 2.000E 04 EV	GH		61
ISEE-B (DAUGHTER-01) PASCHMANN	R 5.000E 00 TO 2.000E 04 EV	GH		61
50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE.....	R 5.000E 00 TO 2.000E 04 EV	GH		61
ISEE-C (HELECTR-01) BAME	R 5.000E 00 TO 2.000E 04 EV	GH		61
150-EV TO 7-KEV PROTON AND 5-EV TO 2.5-KEV ELECTRON PLASMA PROBE.....	R 5.000E 00 TO 2.000E 04 EV	GH		61
ISEE-A (MOTHER-01) BAME	R 5.000E 00 TO 2.000E 04 EV	GH		61
50-EV TO 40-KEV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE.....	R 5.000E 00 TO 2.000E 04 EV	GH		61
MJS 77B (HARN77B-06) BRIDGE	R 5.000E 00 TO 2.000E 04 EV	H 6 5		80
PLASMA.....	R 5.000E 00 TO 2.000E 04 EV	GH		50
IMP-H (72-073A-10) BAME	R 5.000E 00 TO 2.000E 04 EV	H 6 5		77
MEASUREMENT OF SOLAR PLASMA.....	R 6.000E 00 TO 1.000E 04 EV	DEFGH		60
MJS 77A (HARN77A-06) BRIDGE	R 6.000E 00 TO 1.330E 03 EV	GH		21
PLASMA.....	R 6.000E 00 TO 2.400E 04 EV	DEFGH		53
ISEE-A (MOTHER-02) OGILVIE	R 7.500E 00 TO 1.850E 04 EV	GH		139
THREE-DIMENSIONAL (SIX AXES), 6-EV TO 10-KEV ELECTRON SPECTROMETERS.....	R 7.500E 00 TO 1.850E 04 EV	GH		141
APOLLO 12 LM/ALSEP (69-099C-02) SNYDER	R 1.000E 01 TO 1.000E 04 EV	C		69
SOLAR WIND SPECTROMETER.....	R 1.000E 01 TO 1.000E 03 EV	DE		17
IMP-I (71-019A-11) BAME	R 1.200E 01 TO 1.000E 03 EV	H		100
MEASUREMENT OF SOLAR PLASMA.....	R 1.200E 01 TO 1.000E 03 EV	H		101
VELA 5A (69-046D-05) BAME	R 1.200E 01 TO 1.000E 03 EV	H		101
SOLAR WIND EXPERIMENT.....	R 1.200E 01 TO 1.000E 03 EV	H		101
VELA 6A (70-027A-05) BAME	R 1.200E 01 TO 1.000E 03 EV	H		101
SOLAR WIND EXPERIMENT.....	R 1.200E 01 TO 1.000E 03 EV	H		101
ISIS 2 (71-024A-05) HEIKKILA	R 1.200E 01 TO 1.000E 03 EV	H		101
SOFT-PARTICLE SPECTROMETER.....	R 1.200E 01 TO 1.000E 03 EV	H		101
EXOS-B (EXOS-B-02) UNKNOWN	R 1.200E 01 TO 1.000E 03 EV	H		101
ENERGETIC PARTICLE DETECTORS.....	R 1.200E 01 TO 1.000E 03 EV	H		101
PIONEER 8 (67-123A-02) WOLFF	R 1.200E 01 TO 1.000E 03 EV	H		101
ELECTROSTATIC ANALYZER.....	R 1.200E 01 TO 1.000E 03 EV	H		101
PIONEER 9 (68-100A-02) WOLFF	R 1.200E 01 TO 1.000E 03 EV	H		101
ELECTROSTATIC ANALYZER.....	R 1.200E 01 TO 1.000E 03 EV	H		101
PIONEER 8 (67-123A-02) WOLFF	R 1.200E 01 TO 1.000E 03 EV	H		101
ELECTROSTATIC ANALYZER.....	R 1.200E 01 TO 1.000E 03 EV	H		101
PIONEER 9 (68-100A-02) WOLFF	R 1.200E 01 TO 1.000E 03 EV	H		101
ELECTROSTATIC ANALYZER.....	R 1.200E 01 TO 1.000E 03 EV	H		101
PIONEER 8 (67-123A-02) WOLFF	R 1.200E 01 TO 1.000E 03 EV	H		101
ELECTROSTATIC ANALYZER.....	R 1.200E 01 TO 1.000E 03 EV	H		101
PIONEER 9 (68-100A-02) WOLFF	R 1.200E 01 TO 1.000E 03 EV	H		101
ELECTROSTATIC ANALYZER.....	R 1.200E 01 TO 1.000E 03 EV	H		101
HELIOS-B (HELI-B-00) ROSENBAUER	R 1.600E 01 TO 1.000E 03 EV	H		49
PLASMA DETECTORS.....	R 1.600E 01 TO 1.000E 03 EV	H		47
HELIOS-A (HELI-A-00) ROSENBAUER	R 1.600E 01 TO 1.000E 03 EV	H		47
PLASMA DETECTORS.....	R 1.700E 01 TO 7.000E 03 EV	GH		50
IMP-H (72-073A-02) BRIDGE	R 1.700E 01 TO 7.000E 03 EV	GH		55
MEASUREMENT OF SOLAR PLASMA.....	R 1.700E 01 TO 7.000E 03 EV	GH		55
IMP-J (73-070A-02) BRIDGE	R 1.700E 01 TO 7.000E 03 EV	GH		55
MEASUREMENT OF SOLAR PLASMA.....	R 2.000E 01 TO 3.300E 04 EV	GH		140
VELA 5D (69-046E-05) BAME	R 2.000E 01 TO 3.300E 04 EV	GH		139
SOLAR WIND EXPERIMENT.....	R 2.000E 01 TO 3.300E 04 EV	G		141
VELA 5A (69-046D-05) BAME	R 2.000E 01 TO 3.300E 04 EV			
SOLAR WIND EXPERIMENT.....	R 2.400E 01 TO 1.100E 03 EV	H		53
VELA 6A (70-027A-05) BAME	R 3.500E 01 TO 7.000E 03 EV	GH		62
SOLAR WIND EXPERIMENT.....	R 4.000E 01 TO 2.000E 03 EV	GH		22
APOLLO 14 LM/ALSEP (71-008C-00) O'BRIEN	R 5.000E 01 TO 5.000E 02 EV	F		30
CHARGED PARTICLE LUNAR ENVIRONMENT.....				
ATS 6 (74-039A-05) MCILWAIN				
AURORAL PARTICLES EXPERIMENT.....				
ATS 5 (69-069A-11) MCILWAIN				
BIDIRECTIONAL LOW-ENERGY PARTICLE				

SATELLITE NAME	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS	REGION	PLANET
DESCRIPTIVE EXPERIMENT TITLE	MIN VALUE (F OR E)	MAX VALUE (F OR E)	MIN	MAX	ABCEFGHIJ
	MIN	MAX	VALUE (LAMBDA)	MIN	6789

2.1.1 THERMAL ENERGIES (LESS THAN OR EQUAL TO 1 KEV)

DETECTOR.....	(65-105A-02) BRIDGE	R 0.000E 01 TO 0.000E 02 EV	F	20
PIONEER 6.....	(65-105A-02) BRIDGE	R 0.000E 01 TO 1.500E 03 EV	H	96
LUNAR WIND PLASMA FARADAY CUP.....	(73-010A-13) WOLFE	R 1.000E 02 TO 1.000E 04 EV	H	5 107
PIONEER 11.....	(72-012A-13) WOLFE	R 1.000E 02 TO 1.000E 04 EV	H	5 104
PLASMA EXPERIMENT.....	(73-101A-12) HOFFMAN	R 2.000E 02 TO 2.500E 04 EV	R	10
PIONEER 10.....	(AE-0 -12) HOFFMAN	R 2.000E 02 TO 2.500E 04 EV	S	13
PLASMA EXPERIMENT.....	(ES60 -02) HULTQUIST	U 2.000E 02 TO 2.000E 03 EV	F	35
AE-C.....	(577A-2A-02) JOHNSON	R 5.000E 02 TO 5.000E 03 EV	C	121
AE-D.....	(74-039A-05) MCILWAIN	R 5.000E 02 TO 5.000E 03 EV	F	30
LOW-ENERGY ELECTRONS.....	(69-069A-11) MCILWAIN	R 6.000E 02 TO 6.000E 03 EV	F	20
ESRO GEUS.....	(5773-6A-04) MOOMEY	R 1.000E 03 TO 1.000E 04 EV	C	117
LOW-ENERGY ELECTRON AND PROTON PITCH.....	(74-040A-02) FRANK	R 1.000E 03 TO 1.000E 04 EV	DEFG	42
ANGLE DISTRIBUTION.....	(DAUGHTER-03) FRANK	R 1.000E 03 TO 1.000E 04 EV	GH	62
SESP 7A-2.....	(73-070A-04) FRANK	R 1.000E 03 TO 1.000E 04 EV	GH	55
LOW-ENERGY PARTICLE SPECTROMETER.....	(FX05-B -02) UNKNOWN	U 1.000E 03 TO 1.000E 04 EV	TF	37
ATS 6.....	(72-073A-04) FRANK	R 1.000E 03 TO 1.000E 04 EV	GH	51
AURORAL PARTICLES EXPERIMENT.....				
ATS 5.....				
BIDIRECTIONAL LOW-ENERGY PARTICLE DETECTOR.....				
S3-2.....				
LOW-ENERGY (1-100 KEV) PARTICLE SPECTROMETER.....				
HAWKEYE 1.....				
LOW-ENERGY PROTONS AND ELECTRONS.....				
ISEE-B.....				
HOT PLASMA.....				
IMP-J.....				
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....				
EXOS-0.....				
ENERGETIC PARTICLE DETECTORS.....				
IMP-H.....				
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....				

2.1.2 ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)

IMP-1.....	(71-019A-03) FRANK	R 1.000E 03 TO 1.200E 04 EV	H	53
LOW-ENERGY PROTONS AND ELECTRONS.....	(73-070A-00) KRIMIGIS	R 1.500E 03 TO 2.500E 06 EV	GH	56
IMP-J.....	(71-008C-08) O'BRIEN	R 2.000E 03 TO 2.000E 04 EV	GH	22
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....	(MOTHER -10) ANDERSON	R 2.000E 03 TO 2.000E 03 EV	GH	59
APOLLO 14 LM/FALSEP.....	(ES60 -04) HULTQUIST	U 2.000E 03 TO 2.000E 04 EV	F	35
CHARGED PARTICLE LUNAR ENVIRONMENT.....	(HELOCTR-09) ANDERSON	R 2.000E 03 TO 2.000E 04 EV	H	63
ISCE-A.....	(DAUGHTER-06) ANDERSON	R 2.000E 03 TO 2.000E 03 EV	GH	62
ENERGETIC ELECTRONS AND PROTONS.....	(71-024A-04) MCILWAIN	R 3.000E 03 TO 4.000E 04 EV	C	69
ESRO GEUS.....	(577A-2A-02) JOHNSON	R 5.000E 03 TO 5.000E 04 EV	C	121
LOW-ENERGY ELECTRON AND PROTON PITCH.....	(74-039A-05) MCILWAIN	R 5.000E 03 TO 5.000E 04 EV	F	30
ANGLE DISTRIBUTION.....	(MOTHER -10) ANDERSON	R 6.000E 03 TO 6.000E 03 EV	GH	59
ISEE-C.....	(DAUGHTER-06) ANDERSON	R 6.000E 03 TO 6.000E 03 EV	GH	62
X RAYS AND ELECTRONS.....	(71-024A-04) MCILWAIN	R 6.000E 03 TO 6.000E 03 EV	GH	62
ISEE-B.....	(5773-6A-04) MOOMEY	R 1.000E 04 TO 1.000E 05 EV	C	117
ENERGETIC ELECTRONS AND PROTONS.....	(69-069A-11) MCILWAIN	R 6.000E 03 TO 6.000E 04 EV	F	20
ISIS 2.....	(69-069A-04) MCILWAIN	R 6.000E 03 TO 1.400E 05 EV	DEF	67
ENERGETIC PARTICLE DETECTORS.....	(MOTHER -10) ANDERSON	R 8.000E 03 TO 8.000E 04 EV	GH	59
SESP 7A-2.....	(DAUGHTER-06) ANDERSON	R 8.000E 03 TO 8.000E 04 EV	GH	62
LOW-ENERGY PARTICLE SPECTROMETER.....	(MARN77A-07) KRIMIGIS	R 1.000E 04 TO 1.000E 05 EV	H 6 5	78
ATS 6.....	(MARN77B-07) KRIMIGIS	R 1.000E 04 TO 1.000E 05 EV	H 6 5	81
AURORAL PARTICLES EXPERIMENT.....	(71-019A-07) BOSTROM	R 1.000E 04 TO INFINITY	FGH	53
IMP-1.....	(74-040A-02) FRANK	R 1.000E 04 TO 5.000E 04 EV	DEFG	42
HAWKEYE 1.....	(DAUGHTER-03) FRANK	R 1.000E 04 TO 5.000E 04 EV	GH	62
LOW-ENERGY PROTONS AND ELECTRONS.....	(MOTHER -03) FRANK	R 1.000E 04 TO 5.000E 04 EV	GH	59
ISEE-B.....	(5773-6A-04) MOOMEY	R 1.000E 04 TO 1.000E 05 EV	C	117
HOT PLASMA.....				
IMP-J.....				
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....				
EXOS-0.....				
ENERGETIC PARTICLE DETECTORS.....				
IMP-H.....				
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....				

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	R RANGE E MIN VALUE S MAX VALUE	(h) (F OR E) (LANSDA)	MEASUREMENTS MIN	REGION	PLANET 6789	PAGE	
2.1.2 ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)									
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....			R 1.000E 04 TO 5.000E 04 EV			GH		51	
IMP-J (73-078A-04) FRANK									
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....			R 1.000E 04 TO 5.000E 04 EV			GH		55	
SOLRAD 11A (SRD-11A-22) VAMPOLA									
SOLAR FLARE ELECTRONS.....			R 1.100E 04 TO 1.400E 05 EV			GH		137	
SOLRAD 11B (SRD-11B-22) VAMPOLA									
SOLAR FLARE ELECTRONS.....			R 1.100E 04 TO 1.400E 05 EV			GH		133	
IMP-I (71-019A-05) FRANK									
LOW-ENERGY PROTONS AND ELECTRONS.....			R 1.200E 04 TO 5.000E 04 EV			H		53	
IMP-I (71-019A-06) ANDERSON									
MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS.....			R 1.000E 04 TO 1.800E 05 EV			H		53	
IMP-I (71-019A-06) ANDERSON									
MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS.....			R 2.000E 04 TO INFINITY			H		53	
ATS 6 (74-039A-04) WINKLER									
PARTICLE ACCELERATION MECHANISMS AND DYNAMICS OF THE OUTER TRAPPING REGION.....			R 2.000E 04 TO 2.000E 05 EV			F		30	
SESP 74-2 (ST74-2A-07) VAMPOLA									
ENERGETIC ELECTRON (0.02-2 MEV) MAGNETIC SPECTROMETER.....			R 2.000E 04 TO 2.000E 05 EV			CD		122	
ISEE-B (DAUGHTR-07) KEPPLER									
ENERGETIC ELECTRONS AND PROTONS.....			R 2.000E 04 TO 2.000E 05 EV			DEFGH		62	
ISEE-C (HELOCYR-09) ANDERSON									
X RAYS AND ELECTRONS.....			R 2.000E 04 TO 2.000E 05 EV			H		63	
ISEE-A (MOTHER -09) WILLIAMS									
ENERGETIC ELECTRONS AND PROTONS.....			R 2.000E 04 TO 2.000E 05 EV			DEFGH		61	
PIONEER 10 (72-012A-05) FILLIUS									
JOVIAN TRAPPED RADIATION.....			N 2.500E 04 TO 2.500E 05 EV			H	5	102	
PIONEER 11 (73-019A-05) FILLIUS									
JOVIAN TRAPPED RADIATION.....			N 2.500E 04 TO 2.500E 05 EV			H	5	105	
VELA 5B (69-046E-04) SINGER									
ELECTRON DETECTORS.....			R 3.000E 04 TO 1.500E 05 EV			GH		140	
VELA 6A (70-027A-04) SINGER									
ELECTRON DETECTORS.....			R 3.000E 04 TO 1.500E 05 EV			GH		141	
VELA 6D (70-027D-04) SINGER									
ELECTRON DETECTORS.....			R 3.000E 04 TO 1.500E 05 EV			GH		142	
IMP-H (72-073A-05) WILLIAMS									
ENERGETIC ELECTRONS AND PROTONS.....			R 3.000E 04 TO 4.000E 05 EV			GH		52	
IMP-J (73-078A-05) WILLIAMS									
ENERGETIC ELECTRONS AND PROTONS.....			R 3.000E 04 TO 4.000E 05 EV			GH		57	
ESRO GEOS (ESGEO -01) PROTZER									
ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION.....			R 3.000E 04 TO 2.000E 05 EV			F		35	
OVS-6 (69-046B-05) YATES									
LOW-ENERGY ELECTRON DETECTOR.....			R 4.000E 04 TO INFINITY			DEFGH		96	
HELIOS-A (HELIO-A-10) KEPPLER									
ENERGETIC ELECTRON DETECTOR.....			R 4.000E 04 TO 1.000E 05 EV			H		46	
HELIOS-B (HELIO-B-10) KEPPLER									
ENERGETIC ELECTRON DETECTOR.....			R 4.000E 04 TO 1.000E 05 EV			H		48	
ALOUETTE 2 (65-098A-04) MCDIARMID									
ENERGETIC PARTICLES DETECTORS.....			R 4.000E 04 TO 3.900E 06 EV			BC		20	
ISIS 2 (71-024A-04) MCDIARMID									
ENERGETIC PARTICLE DETECTORS.....			R 4.000E 04 TO 2.000E 05 EV			C		69	
IMP-I (71-019A-05) FRANK									
LOW-ENERGY PROTONS AND ELECTRONS.....			N 4.500E 04 TO INFINITY			H		53	
HELIOS-A (HELIO-A-08) TRAINOR									
GALACTIC AND SOLAR COSMIC RAYS.....			R 5.000E 04 TO 5.000E 05 EV			H		47	
HELIOS-B (HELIO-B-08) TRAINOR									
GALACTIC AND SOLAR COSMIC RAYS.....			R 5.000E 04 TO 5.000E 05 EV			H		49	
IMP-I (71-019A-08) McDONALD									
SOLAR AND GALACTIC COSMIC-RAY STUDIES.....			P 5.000E 04 TO 2.000E 06 EV			FGH		54	
IMP-H (72-073A-13) CLINE									
STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS.....			R 5.000E 04 TO 5.000E 05 EV			GH		51	
PIONEER 10 (72-012A-11) VAN ALLEN									
JOVIAN CHARGED PARTICLES EXPERIMENT.....			R 5.000E 04 TO INFINITY			H	5	104	
PIONEER 11 (73-019A-11) VAN ALLEN									
JOVIAN CHARGED PARTICLES EXPERIMENT.....			R 5.000E 04 TO INFINITY			H	5	106	
ATS 6 (74-039A-06) MASLEY									
SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION.....			R 5.000E 04 TO 6.000E 05 EV			F		29	
PIONEER 10 (72-012A-12) McDONALD									
COSMIC-RAY SPECTRA.....			R 5.000E 04 TO 1.000E 06 EV			H	5	103	
PIONEER 11 (73-019A-12) McDONALD									
COSMIC-RAY SPECTRA.....			R 5.000E 04 TO 1.000E 06 EV			H	5	105	
ISEE-C (HELOCYR-04) VON ROSENBERG									
SOLAR AND GALACTIC ENERGETIC PARTICLES.....			R 7.000E 04 TO 2.000E 05 EV			H		65	
ATS 6 (74-039A-07) PAULIKAS									
OMNIDIRECTIONAL SPECTROMETER.....			R 8.000E 04 TO 6.000E 05 EV			F		30	
ISEE-A (MOTHER -10) ANDERSON									
ENERGETIC ELECTRONS AND PROTONS.....			R 8.000E 04 TO 2.000E 05 EV			GH		59	
ISEE-B (DAUGHTR-08) ANDERSON									
ENERGETIC ELECTRONS AND PROTONS.....			R 8.000E 04 TO 2.000E 05 EV			GH		62	
S3-2 (ST73-6A-06) MOONEY									
ENERGETIC ELECTRON (0.1- 1.0 MEV) SENSOR.....			R 1.000E 05 TO 1.000E 06 EV			C		117	
HELIOS-A (HELIO-A-10) KEPPLER									
ENERGETIC ELECTRON DETECTOR.....			R 1.000E 05 TO 1.000E 06 EV			H		46	
HELIOS-B (HELIO-B-10) KEPPLER									
ENERGETIC ELECTRON DETECTOR.....			R 1.000E 05 TO 1.000E 06 EV			H		48	
HJS 77A (HARN77A-07) KRIMIGIS									
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....			R 1.000E 05 TO 1.100E 06 EV			H	6	5	78
HJS 77B (HARN77B-07) KRIMIGIS									
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....			R 1.000E 05 TO 1.100E 06 EV			H	4	5	81

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID EXPERIMENT TITLE	EXPERIMENTER	RANGE OF MEASUREMENTS		REGION MAX ABCDEFGH	PLANET 5 10	PAGE
			E MIN S MAX	VALUE (F OR E) (LAMBDA)			
2.1.2 ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)							
PIONEER 10 JOVIAN TRAPPED RADIATION.....	(72-012A-05)	FILLIUS	R 1.000E 05 TO 3.000E 06 EV		H	5	102
PIONEER 11 JOVIAN TRAPPED RADIATION.....	(73-019A-05)	FILLIUS	R 1.000E 05 TO 3.000E 06 EV		H	5	105
IMP-H IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV.....	(72-071A-03)	GLOECKLER	R 1.200E 05 TO 9.000E 05 EV		GH		51
NOAA 3 SOLAR PROTON MONITOR.....	(73-086A-01)	BOSTROM	R 1.400E 05 TO INFINITY		BC		90
NOAA 4 SOLAR PROTON MONITOR.....	(1705-G -01)	BOSTROM	R 1.400E 05 TO INFINITY		BC		91
SOLRAD 110 SOLAR FLARE ELECTRONS.....	(SRD-110-22)	VAMPOLA	R 1.400E 05 TO 1.500E 06 EV		GH		133
SOLRAD 11A SOLAR FLARE ELECTRONS.....	(SRD-11A-22)	VAMPOLA	R 1.400E 05 TO 1.500E 06 EV		GH		130
IMP-H ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....	(72-073A-06)	STONE	R 1.500E 05 TO 1.500E 06 EV		GH		52
IMP-H SOLAR AND COSMIC-RAY PARTICLES.....	(72-073A-09)	MCDONALD	R 1.500E 05 TO 2.000E 06 EV		GH		51
IMP-J ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....	(73-078A-06)	STONE	R 1.500E 05 TO 1.500E 06 EV		GH		57
IMP-J SOLAR AND COSMIC-RAY PARTICLES.....	(73-078A-09)	MCDONALD	R 1.500E 05 TO 2.000E 06 EV		GH		56
IMP-I MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS.....	(71-019A-06)	ANDERSON	R 1.800E 05 TO 4.500E 05 EV		H		53
IMP-I MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS.....	(71-019A-06)	ANDERSON	N 1.800E 05 TO INFINITY		H		53
PIONEER 10 CHARGED PARTICLE COMPOSITION.....	(72-012A-02)	SIMPSON	R 2.000E 05 TO 2.000E 06 EV		H	5	103
PIONEER 11 CHARGED PARTICLE COMPOSITION.....	(73-019A-02)	SIMPSON	R 2.000E 05 TO 2.000E 06 EV		H	5	106
MARINER 10 ENERGETIC PARTICLES.....	(73-085A-07)	SIMPSON	R 2.000E 05 TO 2.000E 06 EV		H	12	77
SESP 74-2 ENERGETIC ELECTRON (0.02-2 MEV) MAGNETIC SPECTROMETER.....	(577A-2A-07)	VAMPOLA	R 2.000E 05 TO 2.000E 06 EV		CD		122
ISIS 1 ENERGETIC PARTICLE DETECTORS.....	(69-009A-04)	MCDIARMID	R 2.000E 05 TO 7.700E 05 EV		DEF		67
ISEE-B ENERGETIC ELECTRONS AND PROTONS.....	(DAUGHTER-07)	KEPPLER	R 2.000E 05 TO 2.000E 06 EV		DEFGH		62
ISEE-C X RAYS AND ELECTRONS.....	(HELECTR-03)	ANDERSON	R 2.000E 05 TO 1.000E 06 EV		H		63
ISEE-A ENERGETIC ELECTRONS AND PROTONS.....	(MOTHER-09)	WILLIAMS	R 2.000E 05 TO 1.000E 06 EV		DEFGH		61
ISIS 2 ENERGETIC PARTICLE DETECTORS.....	(71-024A-04)	MCDIARMID	R 2.000E 05 TO INFINITY		C		69
IMP-F NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS.....	(71-019A-09)	SIMPSON	N 2.000E 05 TO 1.000E 07 EV		GH		55
IMP-H CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....	(72-073A-08)	KRIMIGIS	R 2.200E 05 TO 2.500E 06 EV		GH		51
IMP-H SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT.....	(72-073A-07)	SIMPSON	R 3.000E 05 TO 3.000E 06 EV		GH		52
IMP-J SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS.....	(73-078A-07)	SIMPSON	R 3.000E 05 TO 3.000E 06 EV		GH		57
ISEE-C SOLAR AND GALACTIC ENERGETIC PARTICLES.....	(HELECTR-04)	VON ROSENVING	R 3.000E 05 TO 1.200E 07 EV		H		65
PIONEER 9 COSMIC-RAY TELESCOPE.....	(60-100A-06)	WEBBER	R 3.100E 05 TO 1.900E 06 EV		H		101
PIONEER 8 COSMIC-RAY GRADIENT DETECTOR.....	(67-123A-06)	WEBBER	R 3.400E 05 TO 5.200E 05 EV		H		99
ATS 5 OMNIDIRECTIONAL HIGH-ENERGY PARTICLE DETECTOR.....	(69-069A-03)	MCILWAIN	R 5.000E 05 TO 5.000E 06 EV		F		28
SMS-A ENERGETIC PARTICLE MONITOR.....	(74-033A-02)	WILLIAMS	R 5.000E 05 TO INFINITY		F		123
GOES-B ENERGETIC PARTICLE MONITOR.....	(GOES-B -02)	WILLIAMS	R 5.000E 05 TO INFINITY		F		40
GOES-C ENERGETIC PARTICLE MONITOR.....	(GOES-C -02)	WILLIAMS	R 5.000E 05 TO INFINITY		F		41
HELIOS-A GALACTIC AND SOLAR COSMIC RAYS.....	(HELIO-A-00)	TRAINOR	R 5.000E 05 TO 5.000E 06 EV		H		47
HELIOS-B GALACTIC AND SOLAR COSMIC RAYS.....	(HELIO-B-00)	TRAINOR	R 5.000E 05 TO 5.000E 06 EV		H		49
IMP-H STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS.....	(72-073A-13)	CLINE	R 5.000E 05 TO 2.000E 06 EV		GH		51
SMS-B ENERGETIC PARTICLE MONITOR.....	(SMS-B -01)	WILLIAMS	R 5.000E 05 TO INFINITY		F		124
SMS-C ENERGETIC PARTICLE MONITOR.....	(SMS-C -02)	WILLIAMS	R 5.000E 05 TO INFINITY		F		125
PIONEER 8 COSMIC-RAY GRADIENT DETECTOR.....	(67-123A-06)	WEBBER	R 5.200E 05 TO 4.300E 06 EV		H		99
ATS 6 OMNIDIRECTIONAL SPECTROMETER.....	(74-039A-07)	PAULIKAS	R 6.000E 05 TO 4.000E 06 EV		F		30
ATS 6 PARTICLE ACCELERATION MECHANISMS AND DYNAMICS OF THE OUTER TRAPPING REGION.....	(74-039A-04)	WINCKLER	R 1.000E 06 TO 1.500E 06 EV		F		30
IMP-H ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....	(72-073A-06)	STONE	R 1.500E 06 TO 2.800E 06 EV		GH		52

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID EXPERIMENT TITLE	EXPERIMENTER	RANGE OF MEASUREMENTS		REGION	PLANET	PAGE
			E MIN VALUE S MAX VALUE	(F OR E) MAX (LAMDDA) MIN			
2.1.2 ENERGIES GREATER THAN THERMAL (GREATER THAN 1 KEV)							
IMP-J	(73-078A-06)	STONE					
ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....			R 1.500E 06	TO 2.000E 06	EV	GH	57
PIONEER 9	(68-100A-06)	WEBBER					
COSMIC-RAY TELESCOPE.....			R 1.900E 06	TO 5.100E 06	EV	H	101
PIONEER 10	(72-012A-11)	VAN ALLEN					
JOVIAN CHARGED PARTICLES EXPERIMENT.....			N 2.900E 06	TO INFINITY		H	5 104
PIONEER 11	(73-019A-11)	VAN ALLEN					
JOVIAN CHARGED PARTICLES EXPERIMENT.....			N 2.000E 06	TO INFINITY		H	5 106
IMP-H	(72-073A-09)	MCDONALD					
SOLAR AND COSMIC-RAY PARTICLES.....			R 2.000E 06	TO 1.200E 07	EV	GH	51
IMP-J	(73-078A-09)	MCDONALD					
SOLAR AND COSMIC-RAY PARTICLES.....			R 2.000E 06	TO 1.200E 07	EV	GH	56
PIONEER 10	(72-012A-02)	SIMPSON					
CHARGED PARTICLE COMPOSITION.....			R 2.000E 06	TO 3.000E 07	EV	H	5 103
PIONEER 11	(73-019A-02)	SIMPSON					
CHARGED PARTICLE COMPOSITION.....			R 2.000E 06	TO 3.000E 07	EV	H	5 106
IMP-H	(72-073A-03)	GLOCKLER					
IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV.....			R 2.300E 06	TO 4.200E 06	EV	GH	51
IMP-I	(71-019A-08)	MCDONALD					
SOLAR AND GALACTIC COSMIC-RAY STUDIES.....			R 2.700E 06	TO 2.100E 07	EV	FGH	54
PIONEER 11	(73-019A-05)	FILLIUS					
JOVIAN TRAPPED RADIATION.....			R 3.000E 06	TO 1.000E 06	EV	H	5 105
IMP-H	(72-073A-07)	SIMPSON					
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT.....			R 3.000E 06	TO 1.000E 07	EV	GH	52
IMP-J	(73-070A-07)	SIMPSON					
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS.....			R 3.000E 06	TO 1.000E 07	EV	GH	57
MJS 77A	(MARN77A-08)	VOGT					
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....			R 3.000E 06	TO 1.000E 07	EV	H	5 79
MJS 77D	(MARN77D-08)	VOGT					
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....			R 3.000E 06	TO 1.000E 07	EV	H	5 82
PIONEER 10	(72-012A-05)	FILLIUS					
JOVIAN TRAPPED RADIATION.....			R 3.000E 06	TO INFINITY		H	5 102
ATS 6	(74-039A-07)	PAULIKAS					
OMNIDIRECTIONAL SPECTROMETER.....			R 4.000E 06	TO INFINITY		F	30
PIONEER 8	(67-123A-06)	WEBBER					
COSMIC-RAY GRADIENT DETECTOR.....			R 4.200E 06	TO 0.400E 06	EV	H	99
ISEE-C	(HELOCTR-06)	MEYER					
COSMIC-RAY ELECTRONS AND NUCLEI.....			R 5.000E 06	TO 5.000E 07	EV	H	64
PIONEER 9	(68-100A-06)	WEBBER					
COSMIC-RAY TELESCOPE.....			R 5.100E 06	TO INFINITY		H	101
PIONEER 10	(72-012A-05)	FILLIUS					
JOVIAN TRAPPED RADIATION.....			R 7.000E 06	TO INFINITY		H	5 102
PIONEER 11	(73-019A-05)	FILLIUS					
JOVIAN TRAPPED RADIATION.....			R 7.000E 06	TO 1.000E 06	EV	H	5 105
PIONEER 10	(72-012A-02)	SIMPSON					
CHARGED PARTICLE COMPOSITION.....			R 9.000E 06	TO INFINITY		H	5 103
PIONEER 11	(73-019A-02)	SIMPSON					
CHARGED PARTICLE COMPOSITION.....			R 9.000E 06	TO INFINITY		H	5 106
PIONEER 10	(72-012A-11)	VAN ALLEN					
JOVIAN CHARGED PARTICLES EXPERIMENT.....			R 1.000E 07	TO INFINITY		H	5 104
PIONEER 11	(73-019A-11)	VAN ALLEN					
JOVIAN CHARGED PARTICLES EXPERIMENT.....			R 1.000E 07	TO INFINITY		H	5 106
PIONEER 10	(72-012A-05)	FILLIUS					
JOVIAN TRAPPED RADIATION.....			R 1.000E 07	TO INFINITY		H	5 102
PIONEER 11	(73-019A-05)	FILLIUS					
JOVIAN TRAPPED RADIATION.....			R 1.000E 07	TO 1.000E 06	EV	H	5 105
ISEE-C	(HELOCTR-06)	MEYER					
COSMIC-RAY ELECTRONS AND NUCLEI.....			R 5.000E 07	TO 4.000E 08	EV	H	64

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTOR	RANGE OF MIN VALUE MAX VALUE	MEASUREMENTS REGION (F OR E) (LAMBDA) MIN	PLANET ABCD EFGHIJ 6700	PAGE
2+2 SENSING PROTONS OR HYDROGEN IONS						
HOT PLASMA.....			R 1.000E 00 TO 1.000E 03 EV	GH		59
IMP-I (71-019A-05) FRANK			R 1.700E 00 TO 5.500E 02 EV	H		57
LOW-ENERGY PROTONS AND ELECTRONS.....						
IMP-H (72-073A-04) FRANK						
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....			R 5.000E 00 TO 1.000E 03 EV	GH		51
IMP-J (73-078A-04) FRANK						
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....			R 5.000E 00 TO 1.000E 03 EV	TH		55
ISIS 2 (71-024A-05) HEIKKILA			R 1.000E 01 TO 1.000E 04 EV	C		69
SOFT-PARTICLE SPECTROMETER.....						
ANGLO 15 LUNARSEP (71-063C-05) FREEMAN			R 1.000E 01 TO 3.500E 03 EV	GH	M	23
SUPRATHERMAL ION DETECTOR.....						
EXOS-B (EXOS-B-02) UNKNOWN			U 1.000E 01 TO 1.000E 03 EV	DE		37
ENERGETIC PARTICLE DETECTORS.....						
APOLLO 14 LUNARSEP (71-008C-06) FREEMAN			P 1.000E 01 TO 3.500E 03 EV	GH		22
SUPRATHERMAL ION DETECTOR.....						
APOLLO 12 LUNARSEP (69-399C-02) SNYDER			R 1.800E 01 TO 9.700E 03 EV	GH	4	21
SOLAR WIND SPECTROMETER.....						
VELA 9B (69-046E-01) NAME			R 2.000E 01 TO 3.100E 04 EV	GH		140
SOLAR WIND EXPERIMENT.....						
VELA 5A (69-046D-01) NAME			R 2.000E 01 TO 3.300E 04 EV	GH		139
SOLAR WIND EXPERIMENT.....						
VELA 6A (71-019A-05) FRANK			R 2.000E 01 TO 3.300E 04 EV	G		141
SOLAR WIND EXPERIMENT.....						
IMP-I (71-019A-05) FRANK			R 2.400E 01 TO 1.100E 03 EV	H		53
LOW-ENERGY PROTONS AND ELECTRONS.....						
IMP-I (71-019A-11) NAME			R 4.500E 01 TO 3.400E 04 EV	DEFGH		53
MEASUREMENT OF SOLAR PLASMA.....						
ATS 6 (74-039A-05) MCILWAIN			R 5.000E 01 TO 5.000E 02 EV	F		30
AURORAL PARTICLES EXPERIMENT.....						
ISEE-B (DAUGHTER-01) MASCHMANN						
50-EV TO 40-KV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE.....			R 5.000E 01 TO 4.000E 04 EV	GH		63
ISEE-A (MOTHER-01) NAME						
50-EV TO 40-KV PROTON AND 5-EV TO 20-KEV ELECTRON PLASMA PROBE.....			R 5.000E 01 TO 4.000E 04 EV	GH		59
IMP-J (73-078A-02) BRIDGE			R 5.000E 01 TO 7.000E 03 EV	GH		55
MEASUREMENT OF SOLAR PLASMA.....						
ISEE-H (DAUGHTER-02) EGIDI						
50-EV TO 25-KV ION AND 35-EV TO 7-KEV ELECTRON PLASMA PROBE.....			R 5.000E 01 TO 2.500E 04 EV	GH		62
PIONEER VENUS ORBITER (P10780R-18) WOLFE			P 5.000E 01 TO 8.000E 03 EV		2	110
SOLAR WIND PLASMA DETECTOR.....						
IMP-H (72-073A-02) BRIDGE			R 5.000E 01 TO 7.000E 03 EV	GH		50
MEASUREMENT OF SOLAR PLASMA.....						
ATS 5 (69-069A-11) MCILWAIN						
BIDIRECTIONAL LOW-ENERGY PARTICLE DETECTOR.....			R 6.000E 01 TO 6.000E 02 EV	F		28
PIONEER 6 (65-105A-02) BRIDGE			R 7.500E 01 TO 9.485E 03 EV	H		96
SOLAR WIND PLASMA FARADAY CUP.....						
IMP-I (71-019A-11) NAME			R 1.000E 02 TO 8.000E 03 EV	DEFGH		53
MEASUREMENT OF SOLAR PLASMA.....						
PIONEER 10 (72-012A-13) WOLFE			R 1.000E 02 TO 1.800E 04 EV	H	5	104
PLASMA EXPERIMENT.....						
PIONEER 11 (73-019A-13) WOLFE			R 1.000E 02 TO 1.800E 04 EV	H	5	107
PLASMA EXPERIMENT.....						
VELA 6A (70-027A-05) NAME			P 1.200E 02 TO 5.000E 03 EV	GH		141
SOLAR WIND EXPERIMENT.....						
VELA 5A (69-046D-05) NAME			R 1.200E 02 TO 5.000E 03 EV	GH		139
SOLAR WIND EXPERIMENT.....						
PIONEER 8 (67-123A-02) WOLFE			R 1.500E 02 TO 1.500E 04 EV	H		100
ELECTROSTATIC ANALYZER.....						
PIONEER 9 (68-100A-02) WOLFE			R 1.500E 02 TO 1.500E 04 EV	H		101
ELECTROSTATIC ANALYZER.....						
ISEE-C (HELIOCTR-01) NAME						
150-EV TO 7-KEV PROTON AND 5-EV TO 2.5-KEV ELECTRON PLASMA PROBE.....			R 1.500E 02 TO 7.000E 03 EV	GH		63
PIONEER 8 (67-123A-02) WOLFE			R 1.500E 02 TO 1.500E 04 EV	H		100
ELECTROSTATIC ANALYZER.....						
PIONEER 9 (68-100A-02) WOLFE			R 1.500E 02 TO 1.500E 04 EV	H		101
ELECTROSTATIC ANALYZER.....						
PIONEER 8 (67-123A-02) WOLFE			R 1.500E 02 TO 1.500E 04 EV	H		100
ELECTROSTATIC ANALYZER.....						
PIONEER 9 (68-100A-02) WOLFE			R 1.500E 02 TO 1.500E 04 EV	H		101
ELECTROSTATIC ANALYZER.....						
PIONEER 8 (67-123A-02) WOLFE			R 1.500E 02 TO 1.500E 04 EV	H		100
ELECTROSTATIC ANALYZER.....						
APOLLO 14 LUNARSEP (71-008C-06) FREEMAN			P 1.700E 02 TO 2.300E 03 EV	GH	M	22
CHARGED PARTICLE LUNAR ENVIRONMENT.....						
IMP-J (73-078A-02) NAME			R 2.000E 02 TO 2.000E 04 EV	GH		55
MEASUREMENT OF SOLAR PLASMA.....						
SESP 7A-2 (577A-2A-08) FENNELL						
HYDROGEN-HELIUM MASS SPECTROMETER (HFA) AND H+ 13-80 KEV, PROTONS 0.2-103 KEV.....			2.000E 02 TO 1.000E 03 EV	CD		121
PIONEER 7 (66-075A-03) WOLFE			R 2.000E 02 TO 1.000E 04 EV	H		98
ELECTROSTATIC ANALYZER.....						
IMP-H (72-073A-10) NAME			R 2.000E 02 TO 2.000E 04 EV	GH		50
MEASUREMENT OF SOLAR PLASMA.....						
ESR-1 GDS (ESR-1-04) HULTQUIST			U 2.000E 02 TO 2.000E 03 EV	F		35
LOW-ENERGY ELECTRON AND PROTON RICH ANGLE DISTRIBUTION.....						
HEL105-B (HEL105-B-04) ROSENBAUER			R 2.100E 02 TO 1.600E 04 EV	H		49
PLASMA DETECTORS.....						
HEL105-A (HEL105-A-03) ROSENBAUER			R 2.100E 02 TO 1.600E 04 EV	H		47
PLASMA DETECTORS.....						
SESP 7A-2 (577A-2A-02) JOHNSON			R 5.000E 02 TO 5.000E 03 EV	CD		121
LOW-ENERGY PARTICLE SPECTROMETER.....						

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MIN VALUE MAX VALUE	MEASUREMENTS (F D E) (LAMBDA)	REGION MAX MIN	PLANET ABCD EFGHIJ 0123456789	PAGE
2-2 SENSING PROTONS OR HYDROGEN IONS							
ATS 6	(74-039A-05)	MCILWAIN	R 5.000E 02 TO 5.000E 03 EV		F		30
AURORAL PARTICLES EXPERIMENT.....							
ATS 5	(69-069A-11)	MCILWAIN	R 6.000E 02 TO 6.000E 03 EV		F		28
BIDIRECTIONAL LOW-ENERGY PARTICLE DETECTOR.....							
MARINER 10	(73-085A-03)	DRIDGE	R 8.000E 02 TO 8.000E 03 EV		H		75
MEASUREMENT OF PLASMA ENVIRONMENT.....							
EXOS-B	(EXOS-B -02)	UNKNOWN	U 1.000E 03 TO 1.000E 04 EV		DE		37
ENERGETIC PARTICLE DETECTORS.....							
SJ-2	(5773-6A-04)	MOONEY	R 1.000E 03 TO 1.000E 04 EV		C		117
LOW-ENERGY (1-100 KEV) PARTICLE SPECTROMETER.....							
IMP-H	(72-073A-04)	FRANK	R 1.000E 03 TO 1.000E 04 EV		GH		51
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....							
IMP-J	(73-078A-04)	FRANK	R 1.000E 03 TO 1.000E 04 EV		GH		55
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....							
HAWKEYE 1	(74-040A-02)	FRANK	R 1.000E 03 TO 1.000E 04 EV		DEFG		42
LOW-ENERGY PROTONS AND ELECTRONS.....							
ISEE-A	(MOTHER -03)	FRANK	R 1.000E 03 TO 1.000E 04 EV		GH		59
HOT PLASMA.....							
ISEE-B	(DAUGHTER-03)	FRANK	R 1.000E 03 TO 1.000E 04 EV		GH		62
HOT PLASMA.....							
IMP-I	(71-019A-05)	FRANK	R 1.100E 03 TO 1.200E 04 EV		H		53
LOW-ENERGY PROTONS AND ELECTRONS.....							
ISEE-B	(DAUGHTER-00)	ANDERSON	R 2.000E 03 TO 2.000E 03 EV		GH		62
ENERGETIC ELECTRONS AND PROTONS.....							
ESRO GEOS	(ESRO -04)	HULTQUIST	U 2.000E 03 TO 2.000E 04 EV		F		35
LOW-ENERGY ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION.....							
APOLLO 14 LM/ALSEP	(71-008C-08)	O'BRIEN	P 2.000E 03 TO 2.000E 04 EV		GH	M	22
CHARGED PARTICLE LUNAR ENVIRONMENT.....							
ISEE-A	(MOTHER -10)	ANDERSON	R 2.000E 03 TO 2.000E 03 EV		GH		59
ENERGETIC ELECTRONS AND PROTONS.....							
SESP 74-2	(5774-2A-02)	JOHNSON	R 5.000E 03 TO 5.000E 04 EV		CJ		121
LOW-ENERGY PARTICLE SPECTROMETER.....							
ATS 6	(74-039A-05)	MCILWAIN	R 5.000E 03 TO 5.000E 04 EV		F		30
AURORAL PARTICLES EXPERIMENT.....							
ISEE-B	(DAUGHTER-06)	ANDERSON	P 6.000E 03 TO 6.000E 03 EV		GH		62
ENERGETIC ELECTRONS AND PROTONS.....							
ATS 5	(69-069A-11)	MCILWAIN	R 6.000E 03 TO 6.000E 04 EV		F		28
BIDIRECTIONAL LOW-ENERGY PARTICLE DETECTOR.....							
ISEE-A	(MOTHER -10)	ANDERSON	P 6.000E 03 TO 6.000E 03 EV		GH		59
ENERGETIC ELECTRONS AND PROTONS.....							
SESP 74-2	(5774-2A-08)	PENNFELL	1.000E 04 TO 8.000E 04 EV		CJ		121
HYDROGEN-HELIUM MASS SPECTROMETER (HE+ AND H+ 10-80 KEV, PROTONS 0.2-100 KEV).....							
IMP-H	(72-073A-04)	FRANK	R 1.000E 04 TO 5.000E 04 EV		GH		51
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....							
SJ-2	(5773-6A-04)	MOONEY	R 1.000E 04 TO 1.000E 05 EV		C		117
LOW-ENERGY (1-100 KEV) PARTICLE SPECTROMETER.....							
IMP-J	(73-078A-04)	FRANK	R 1.000E 04 TO 5.000E 04 EV		GH		55
MEASUREMENT OF LOW-ENERGY PROTONS AND ELECTRONS.....							
ISEE-B	(DAUGHTER-03)	FRANK	R 1.000E 04 TO 5.000E 05 EV		GH		62
HOT PLASMA.....							
ISEE-A	(MOTHER -10)	ANDERSON	R 1.000E 04 TO 1.000E 05 EV		GH		59
ENERGETIC ELECTRONS AND PROTONS.....							
HAWKEYE 1	(74-040A-02)	FRANK	R 1.000E 04 TO 5.000E 04 EV		DEFG		42
LOW-ENERGY PROTONS AND ELECTRONS.....							
ISEE-A	(MOTHER -03)	FRANK	R 1.000E 04 TO 5.000E 04 EV		GH		59
HOT PLASMA.....							
ISEE-B	(DAUGHTER-08)	ANDERSON	R 1.000E 04 TO 1.000E 05 EV		GH		62
ENERGETIC ELECTRONS AND PROTONS.....							
IMP-I	(71-019A-05)	FRANK	R 1.200E 04 TO 5.000E 04 EV		H		53
LOW-ENERGY PROTONS AND ELECTRONS.....							
ISIS 2	(71-024A-04)	MCDIARMID	R 2.000E 04 TO 2.000E 05 EV		C		69
ENERGETIC PARTICLE DETECTORS.....							
ATS 6	(74-039A-01)	FR.	R 2.000E 04 TO 3.000E 05 EV		F		29
MEASUREMENT OF LOW-ENERGY PROTONS.....							
ISEE-A	(MOTHER -09)	WILLIAMS	R 2.000E 04 TO 2.000E 05 EV		OFFGH		61
ENERGETIC ELECTRONS AND PROTONS.....							
SOLRAD 11A	(SRD-11A-17)	BLAKE	R 2.000E 04 TO 5.000E 05 EV		GH		127
OMNIDIRECTIONAL PROTONS.....							
SOLRAD 11B	(SRD-11B-17)	BLAKE	R 2.000E 04 TO 5.000E 05 EV		GH		131
OMNIDIRECTIONAL PROTONS.....							
ATS 6	(74-039A-04)	WINCKLER	R 2.000E 04 TO 5.000E 05 EV		F		30
PARTICLE ACCELERATION MECHANISMS AND DYNAMICS OF THE OUTER TRAPPING REGION.....							
ISEE-B	(DAUGHTER-07)	KEPLER	R 2.500E 04 TO 2.000E 05 EV		OFFGH		62
ENERGETIC ELECTRONS AND PROTONS.....							
ISEE-C	(HELICUT-00)	DE FEITER	R 3.000E 04 TO 3.000E 05 EV		H		64
ENERGETIC PROTONS.....							
IMP-J	(73-078A-05)	WILLIAMS	R 3.000E 04 TO 3.000E 05 EV		GH		57
ENERGETIC ELECTRONS AND PROTONS.....							
IMP-H	(72-073A-05)	WILLIAMS	R 3.000E 04 TO 3.000E 05 EV		GH		52
ENERGETIC ELECTRONS AND PROTONS.....							
ESRO GEOS	(ESRO -01)	PROTZER	R 4.000E 04 TO 4.000E 05 EV		F		35
ELECTRON AND PROTON PITCH ANGLE DISTRIBUTION.....							
IMP-I	(71-019A-06)	ANDERSON	R 4.000E 04 TO 4.000E 05 EV		H		53
MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS.....							
ISIS 1	(69-009A-04)	MCDIARMID	R 5.000E 04 TO 5.000E 05 EV		C		67
ENERGETIC PARTICLE DETECTORS.....							

SATELLITE NAME	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS	REGION	PLANET	
DESCRIPTIVE EXPERIMENT TITLE	MIN VALUE (F OR S)	MAX VALUE (LAMBDA)	MIN	MAX	ABCODEFGHIJ	712345M
					6789	PAGE
2-2 SENSING PROTONS OR HYDROGEN IONS						
IMP-I (71-019A-08) McDONALD	P 5.000E 04 TO 2.000E 06	FV	FGH			54
SOLAR AND GALACTIC COSMIC-RAY STUDIES						
PIONEER 10 (72-012A-12) McDONALD	R 5.000E 04 TO 2.000E 07	EV	H	5		103
COSMIC-RAY SPECTRA						
PIONEER 11 (73-019A-12) McDONALD	R 5.000E 04 TO 2.000E 07	EV	H	5		105
COSMIC-RAY SPECTRA						
IMP-H (72-073A-03) McDONALD	R 5.000E 04 TO 5.000E 05	EV	GH			51
SOLAR AND COSMIC-RAY PARTICLES						
IMP-J (73-078A-09) McDONALD	R 5.000E 04 TO 5.000E 05	EV	GH			56
SOLAR AND COSMIC-RAY PARTICLES						
MJS 77A (MARN77A-07) KRIMIGIS	R 5.000E 04 TO 5.000E 05	EV	H	6	5	78
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE						
MJS 77B (MARN77B-07) KRIMIGIS	R 5.000E 04 TO 5.000E 05	EV	H	6	5	81
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE						
SESP 74-2 (577A-2A-03) KELLY	1.000E 05 TO 1.000E 06	EV	C			121
LOW-ENERGY PARTICLE SENSORS (0.1-100MEV)						
HELIOS-A (MFLIN-A-00) TRAINOR	R 1.000E 05 TO 1.000E 06	EV	H			67
GALACTIC AND SOLAR COSMIC RAYS						
HELIOS-B (HELID-B-00) TRAINOR	R 1.000E 05 TO 1.000E 06	EV	H			49
GALACTIC AND SOLAR COSMIC RAYS						
ISEE-A (MOTHER-10) ANDERSON	R 1.000E 05 TO 3.800E 05	EV	GH			59
ENERGETIC ELECTRONS AND PROTONS						
ISEE-B (DAUGHTER-08) ANDERSON	R 1.000E 05 TO 3.800E 05	EV	GH			62
ENERGETIC ELECTRONS AND PROTONS						
IMP-H (72-073A-03) GLOCKLER	R 1.200E 05 TO 6.500E 05	EV	GH			51
IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV						
ITOS-H (ITOS-H-04) SHENK	R 1.500E 05 TO 1.500E 06	EV	C			71
SPACE ENVIRONMENTAL MONITOR (SEM)						
ITOS-I (ITOS-I-04) UNKNOWN	R 1.500E 05 TO 1.500E 06	EV	C			72
SPACE ENVIRONMENTAL MONITOR (SEM)						
ITOS-J (ITOS-J-04) UNKNOWN	R 1.500E 05 TO 1.500E 06	EV	C			73
SPACE ENVIRONMENTAL MONITOR (SEM)						
MJS 77A (MARN77A-00) VOGT	R 1.500E 05 TO 6.000E 06	EV	H	6	5	79
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE						
SOLRAD 11A (SRD-11A-21) KELLEY	R 1.500E 05 TO 1.000E 06	EV	GH			120
LOW-ENERGY PROTON SPECTROMETER						
SOLRAD 11B (SRD-11B-21) KELLEY	R 1.500E 05 TO 1.000E 06	EV	GH			132
LOW-ENERGY PROTON SPECTROMETER						
ISIS 1 (69-009A-04) CDIARMID	R 1.500E 05 TO 3.000E 07	FV	C			67
ENERGETIC PARTICLE DETECTORS						
ISIS 2 (71-024A-04) CDIARMID	R 1.500E 05 TO 5.500E 07	EV	C			69
ENERGETIC PARTICLE DETECTORS						
MJS 77B (MARN77B-00) VOGT	R 1.500E 05 TO 6.000E 06	EV	H	6	5	82
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE						
ATS 6 (74-039A-06) HASLEY	R 2.000E 05 TO 2.000E 06	EV	C			29
SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION						
ISEE-H (DAUGHTER-07) KPPPLER	R 2.000E 05 TO 2.000E 06	EV	DEFGH			62
ENERGETIC ELECTRONS AND PROTONS						
ISEE-A (MOTHER-00) WILLIAMS	R 2.000E 05 TO 2.000E 06	EV	DEFGH			61
ENERGETIC ELECTRONS AND PROTONS						
ISIS 2 (71-024A-04) CDIARMID	R 2.000E 05 TO 5.000E 05	EV	C			69
ENERGETIC PARTICLE DETECTORS						
IMP-I (71-019A-07) BOSTROM	R 2.000E 05 TO 2.000E 06	EV	FGH			53
MONITORING OF SOLAR PROTONS						
IMP-H (72-073A-03) GLOCKLER	R 2.000E 05 TO 3.000E 06	EV	GH			51
IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV						
IMP-J (73-078A-08) KRIMIGIS	R 2.500E 05 TO 5.000E 06	EV	GH			56
CHARGED PARTICLE MEASUREMENTS EXPERIMENT						
IMP-I (71-019A-06) ANDERSON	R 2.500E 05 TO INFINITY		H			53
MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS						
NOAA 2 (72-082A-01) BOSTROM	R 2.700E 05 TO 3.200E 06	FV	HC			90
SOLAR PROTON MONITOR						
NOAA 3 (73-086A-01) BOSTROM	R 2.700E 05 TO 3.200E 06	EV	HC			90
SOLAR PROTON MONITOR						
NOAA 4 (1705-G-01) BOSTROM	R 2.700E 05 TO 3.200E 06	FV	HC			91
SOLAR PROTON MONITOR						
VELA 50 (69-046E-03) SINGER	R 3.000E 05 TO 3.000E 06	EV	GH			140
SOLAR PARTICLE TELESCOPES						
VELA 6A (70-027A-03) SINGER	R 3.000E 05 TO 3.000E 06	EV	GH			141
SOLAR PARTICLE TELESCOPES						
VELA 6B (70-027B-03) SINGER	R 3.000E 05 TO 3.000E 06	EV	GH			142
SOLAR PARTICLE TELESCOPES						
IMP-H (72-073A-08) KRIMIGIS	R 3.000E 05 TO 2.000E 06	EV	GH			51
CHARGED PARTICLE MEASUREMENTS EXPERIMENT						
IMP-J (73-078A-05) WILLIAMS	R 3.000E 05 TO 1.000E 06	FV	GH			57
ENERGETIC ELECTRONS AND PROTONS						
ISEE-C (INFLECTOR-08) DE PEITER	R 3.000E 05 TO 1.400E 06	EV	H			64
ENERGETIC PROTONS						
IMP-H (72-073A-05) WILLIAMS	R 3.000E 05 TO 1.000E 06	EV	GH			52
ENERGETIC ELECTRONS AND PROTONS						
ESRO GEUS (ESGFI-01) POTZER	R 4.000E 05 TO 1.400E 06	FV	F			35
ELECTRON AND PHOTON PITCH ANGLE DISTRIBUTION						
IMP-I (71-019A-05) ANDERSON	R 4.000E 05 TO 2.000E 06	EV	H			51
MEDIUM-ENERGY SOLAR PROTONS AND ELECTRONS						
PIONEER 10 (72-012A-22) SIMPSON	R 4.500E 05 TO 1.500E 06	FV	H	5		103
CHARGED PARTICLE COMPOSITION						
PIONEER 11 (71-019A-03) SIMPSON	R 4.500E 05 TO 1.500E 06	FV	H	5		106
CHARGED PARTICLE COMPOSITION						
IMP-I (71-019A-19) SIMPSON	R 5.000E 05 TO 1.000E 07	FV	GH			55
NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS						

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID EXPERIMENT TITLE	EXPERIMENTER	RANGE OF MEASUREMENTS REGION		PLANET AUCDEFGHIJ012345M 6789	PAGE
			E MIN VALUE S MAX VALUE	(F J P E) (LAMBDA) MIN		
2.2 SENSING PROTONS OR HYDROGEN IONS						
IMP-H	(72-073A-13)	CLINE				
STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS.....	(HELECTRO-04)	VON ROSENWING	R 5.000E 05 TO 4.000E 06 EV		GH	51
ISSE-C			R 5.000E 05 TO 4.000E 06 EV		H	54
SOLAR AND GALACTIC ENERGETIC PARTICLES.....	(MOTHER -14)	SIMPSON	R 5.000E 05 TO 5.000E 06 EV		GH	61
ISSE-A			R 5.000E 05 TO 6.000E 06 EV		BC	20
MEDIUM-ENERGY COSMIC RAYS.....	(65-098A-04)	MCDIARMID				
ALOUETTE 2			P 5.000E 05 TO 6.000E 06 EV			
ENERGETIC PARTICLES DETECTORS.....	(72-073A-06)	STONE	R 5.000E 05 TO 5.000E 06 EV		GH	52
IMP-H			R 5.000E 05 TO 5.000E 06 EV		GH	57
ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....	(73-070A-06)	STONE	R 5.000E 05 TO 5.000E 06 EV		GH	51
IMP-H	(72-073A-09)	MCDONALD	R 5.000E 05 TO 5.000E 06 EV		GH	56
SOLAR AND COSMIC-RAY PARTICLES.....	(71-070A-09)	MCDONALD	R 5.000E 05 TO 5.000E 06 EV			
IMP-J			R 5.000E 05 TO 5.000E 06 EV			
SOLAR AND COSMIC-RAY PARTICLES.....	(MARN77A-07)	KRIMIGIS	R 5.000E 05 TO 5.000E 06 EV		H 5 5	78
MJS 77A			R 5.000E 05 TO 5.000E 06 EV		H 5 5	81
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....	(MARN77B-07)	KRIMIGIS	R 5.000E 05 TO 5.000E 06 EV			
MJS 77B			R 5.000E 05 TO 5.000E 06 EV			
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....	(71-019A-05)	FRANK	N 5.000E 05 TO INFINITY		H	53
IMP-I			P 5.000E 05 TO 4.000E 06 EV		FGH	94
LOW-ENERGY PROTONS AND ELECTRONS.....	(71-019A-08)	MCDONALD	R 5.000E 05 TO 4.000E 07 EV		GH	52
IMP-I			R 5.000E 05 TO 4.000E 07 EV		GH	57
SOLAR AND GALACTIC COSMIC-RAY STUDIES.....	(72-073A-06)	STONE	R 5.000E 05 TO 4.000E 07 EV		GH	127
IMP-H			R 5.000E 05 TO 4.000E 07 EV		GH	131
ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....	(SRD-11A-17)	BLAKE	R 1.000E 05 TO INFINITY		GH	76
SOLRAD 11A			R 6.000E 05 TO 6.000E 06 EV		H	78
OMNIDIRECTIONAL PROTONS.....	(SRD-11B-17)	BLAKE	R 6.000E 05 TO 6.000E 06 EV		H 12	77
SOLRAD 11B			R 6.000E 05 TO 2.500E 06 EV		H 5	102
OMNIDIRECTIONAL PROTONS.....	(65-105A-03)	FAN	R 1.000E 06 TO 1.000E 07 EV		H	46
PIONEER 6			R 1.000E 06 TO 1.000E 07 EV		H	49
COSMIC-RAY TELESCOPE.....	(66-075A-06)	SIMPSON	R 1.000E 06 TO 1.000E 07 EV		F	124
PIONEER 7			R 1.000E 06 TO 1.000E 07 EV		F	125
COSMIC-RAY TELESCOPE.....	(73-085A-07)	SIMPSON	R 1.000E 06 TO 8.000E 06 EV		H	101
MARINER 10			R 1.000E 06 TO 8.000E 06 EV		GH	57
ENERGETIC PARTICLES.....	(72-012A-05)	FILLIUS	R 1.000E 06 TO 6.000E 06 EV		GH	128
PIONEER 10			R 1.000E 06 TO 6.000E 06 EV		GH	132
JOVIAN TRAPPED RADIATION.....	(73-019A-05)	FILLIUS	R 1.000E 06 TO 1.000E 07 EV		C?	121
PIONEER 11			R 1.000E 06 TO 1.000E 07 EV		GH	128
JOVIAN TRAPPED RADIATION.....	(HELID-A-07)	KUNOW	R 1.000E 06 TO 1.000E 07 EV		GH	112
HELID-A			R 1.000E 06 TO 1.000E 07 EV		H	99
COSMIC-RAY PARTICLES.....	(HELID-B-07)	KUNOW	R 1.000E 06 TO 1.000E 07 EV		H	47
HELID-B			R 1.000E 06 TO 1.000E 07 EV		H	49
COSMIC-RAY PARTICLES.....	(SMS-B -01)	WILLIAMS	R 1.000E 06 TO 1.000E 07 EV		F	123
SMS-B			R 1.000E 06 TO 1.000E 07 EV		F	40
ENERGETIC PARTICLE MONITOR.....	(SMS-C -02)	WILLIAMS	R 1.000E 06 TO 1.000E 07 EV		F	41
SMS-C			R 1.250E 06 TO 5.600E 06 EV		EFGH	95
ENERGETIC PARTICLE MONITOR.....	(68-100A-05)	MCCRACKEN	R 1.300E 06 TO 2.400E 06 EV		GH	51
PIONEER 9			R 1.500E 06 TO 1.500E 07 EV		C	71
COSMIC-RAY ANISOTROPY.....	(73-078A-05)	WILLIAMS	R 1.500E 06 TO 1.500E 07 EV		C	72
IMP-J			R 1.500E 06 TO 1.500E 07 EV		C	73
ENERGETIC ELECTRONS AND PROTONS.....	(SRD-11A-21)	KELLEY	R 1.500E 06 TO 1.500E 07 EV			
SOLRAD 11A			R 1.500E 06 TO 1.500E 07 EV			
LOW-ENERGY PROTON SPECTROMETER.....	(SRD-11B-21)	KELLEY	R 1.500E 06 TO 1.500E 07 EV			
SOLRAD 11B			R 1.500E 06 TO 1.500E 07 EV			
LOW-ENERGY PROTON SPECTROMETER.....	(ST7A-2A-03)	KELLY	R 1.500E 06 TO 1.500E 07 EV			
SESP 7A-2			R 1.500E 06 TO 1.500E 07 EV			
LOW-ENERGY PARTICLE SENSORS (0.1-100KEV).....	(SRD-11A-23)	KELLEY	R 1.500E 06 TO 1.500E 07 EV			
SOLRAD 11A			R 1.500E 06 TO 1.500E 07 EV			
PHOTON-ALPHA TELESCOPE.....	(SRD-11B-23)	KELLEY	R 1.500E 06 TO 1.500E 07 EV			
SOLRAD 11B			R 1.500E 06 TO 1.500E 07 EV			
PHOTON-ALPHA TELESCOPE.....	(67-123A-05)	MCCRACKEN	R 1.500E 06 TO 1.500E 07 EV			
PIONEER 8			R 1.500E 06 TO 1.500E 07 EV			
COSMIC-RAY ANISOTROPY.....	(HELID-A-08)	TRAINOR	R 1.500E 06 TO 1.500E 07 EV			
HELID-A			R 1.500E 06 TO 1.500E 07 EV			
GALACTIC AND SOLAR COSMIC RAYS.....	(HELID-B-08)	TRAINOR	R 1.500E 06 TO 1.500E 07 EV			
HELID-B			R 1.500E 06 TO 1.500E 07 EV			
GALACTIC AND SOLAR COSMIC RAYS.....	(72-073A-05)	WILLIAMS	R 1.500E 06 TO 1.500E 07 EV			
IMP-H			R 1.500E 06 TO 1.500E 07 EV			
ENERGETIC ELECTRONS AND PROTONS.....	(74-033A-02)	WILLIAMS	R 1.500E 06 TO 1.500E 07 EV			
SMS-A			R 1.500E 06 TO 1.500E 07 EV			
ENERGETIC PARTICLE MONITOR.....	(GOES-D -02)	WILLIAMS	R 1.500E 06 TO 1.500E 07 EV			
GOES-B			R 1.500E 06 TO 1.500E 07 EV			
ENERGETIC PARTICLE MONITOR.....	(GOES-C -02)	WILLIAMS	R 1.500E 06 TO 1.500E 07 EV			
GOES-C			R 1.500E 06 TO 1.500E 07 EV			
ENERGETIC PARTICLE MONITOR.....	(69-040B-03)	YATES	R 1.500E 06 TO 1.500E 07 EV			
GOES-D			R 1.500E 06 TO 1.500E 07 EV			
PHOTON ALPHA PARTICLE TELESCOPE.....	(72-073A-03)	GLOECKLER	R 1.500E 06 TO 1.500E 07 EV			
IMP-H			R 1.500E 06 TO 1.500E 07 EV			
IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV.....	(ITOS-H -04)	SHENK	R 1.500E 06 TO 1.500E 07 EV			
ITOS-H			R 1.500E 06 TO 1.500E 07 EV			
SPACE ENVIRONMENTAL MONITOR (SEM).....	(ITOS-I -04)	UNKNOWN	R 1.500E 06 TO 1.500E 07 EV			
ITOS-I			R 1.500E 06 TO 1.500E 07 EV			
SPACE ENVIRONMENTAL MONITOR (SEM).....	(ITOS-J -04)	UNKNOWN	R 1.500E 06 TO 1.500E 07 EV			
ITOS-J			R 1.500E 06 TO 1.500E 07 EV			
SPACE ENVIRONMENTAL MONITOR (SEM).....	(74-039A-07)	PAULIKAS	R 1.500E 06 TO 1.500E 07 EV			
ATS 6			R 1.500E 06 TO 1.500E 07 EV			
OMNIDIRECTIONAL SPECTROMETER.....	(SRD-11B-23)	BLAKE	R 1.500E 06 TO 1.500E 07 EV			
SOLRAD 11B			R 1.500E 06 TO 1.500E 07 EV			
ANTI-SOLAR PROTONS.....			R 1.500E 06 TO 1.500E 07 EV			

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS		REGION	PLANET	PAGE
			E MIN VALUE	(F OR E) MAX VALUE			
			S MAX VALUE	(LAMDA)	MIN	6789	
2.2 SENSING PROTONS OR HYDROGEN IONS							
ATS 6	(74-039A-06)	MASLEY					
SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION.....			R 2.000E 06 TO 2.000E 07 EV		F		29
IMP-I	(71-019A-07)	BOSTROM					
MONITORING OF SOLAR PROTONS.....			R 2.000E 06 TO 7.500E 06 EV		FGH		53
MARINER 10	(73-085A-07)	SIMPSON					
ENERGETIC PARTICLES.....			R 2.000E 06 TO 2.000E 07 EV		H	12	77
SOLRAD 11A	(SRD-11A-14)	DLAKE					
SOLAR PROTONS.....			R 2.000E 06 TO 1.000E 07 EV		GH		127
SOLRAD 11A	(SRD-11A-23)	DLAKE					
ANTISOLAR PROTONS.....			P 2.000E 06 TO 1.000E 07 EV		GH		127
SOLRAD 11B	(SRD-11B-14)	DLAKE					
SOLAR PROTONS.....			R 2.000E 06 TO 1.000E 07 EV		GH		130
IMP-H	(72-073A-08)	KRIMIGIS					
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....			R 2.000E 06 TO 1.400E 07 EV		GH		51
PIONEER 9	(68-100A-06)	WEBBER					
COSMIC-RAY TELESCOPE.....			R 2.200E 06 TO 1.000E 07 EV		H		101
VELA 5D	(69-046E-03)	SINGER					
SOLAR PARTICLE TELESCOPES.....			R 3.000E 06 TO 5.000E 07 EV		GH		140
VELA 6A	(70-027A-03)	SINGER					
SOLAR PARTICLE TELESCOPES.....			R 3.000E 06 TO 5.000E 07 EV		GH		141
VELA 6B	(70-027B-03)	SINGER					
SOLAR PARTICLE TELESCOPES.....			R 3.000E 06 TO 5.000E 07 EV		GH		142
PIONEER 10	(72-012A-12)	MCDONALD					
COSMIC-RAY SPECTRA.....			R 3.000E 06 TO 3.000E 07 EV		H	5	103
PIONEER 11	(73-019A-12)	MCDONALD					
COSMIC-RAY SPECTRA.....			R 3.000E 06 TO 3.000E 07 EV		H	5	105
NOAA 2	(72-082A-01)	BOSTROM					
SOLAR PROTON MONITOR.....			R 3.200E 06 TO 6.000E 07 EV		BC		90
NOAA 3	(73-086A-01)	BOSTROM					
SOLAR PROTON MONITOR.....			R 3.200E 06 TO 6.000E 07 EV		BC		90
NOAA 4	(1107-G-01)	BOSTROM					
SOLAR PROTON MONITOR.....			R 3.200E 06 TO 6.000E 07 EV		BC		91
PIONEER 8	(67-123A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY.....			R 3.300E 06 TO 6.700E 06 EV		H		99
PIONEER 9	(68-100A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY.....			R 3.300E 06 TO 6.700E 06 EV		H		101
PIONEER 8	(67-123A-06)	WEBBER					
COSMIC-RAY GRADIENT DETECTOR.....			R 3.500E 06 TO 1.100E 07 EV		H		99
ISEE-C	(HELOCTR-04)	VON ROSENVING					
SOLAR AND GALACTIC ENERGETIC PARTICLES.....			R 4.000E 06 TO 5.000E 06 EV		H		65
IMP-H	(72-073A-09)	MCDONALD					
SOLAR AND COSMIC-RAY PARTICLES.....			R 4.000E 06 TO 2.000E 07 EV		GH		51
IMP-J	(73-078A-09)	MCDONALD					
SOLAR AND COSMIC-RAY PARTICLES.....			R 4.000E 06 TO 2.000E 07 EV		GH		56
ISEE-C	(HELOCTR-04)	VON ROSENVING					
SOLAR AND GALACTIC ENERGETIC PARTICLES.....			R 4.000E 06 TO 8.000E 07 EV		H		65
IMP-I	(71-019A-08)	MCDONALD					
SOLAR AND GALACTIC COSMIC-RAY STUDIES.....			R 4.200E 06 TO 1.910E 07 EV		FGH		54
PIONEER 8	(67-123A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY.....			P 4.500E 06 TO 4.000E 07 EV		H		99
PIONEER 9	(68-100A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY.....			P 4.500E 06 TO 4.000E 07 EV		H		101
ISEE-A	(MOTHER-14)	SIMPSON					
MEDIUM-ENERGY COSMIC RAYS.....			5.000E 06 TO 5.000E 07 EV		GH		61
IMP-H	(72-073A-06)	STONE					
ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....			R 5.000E 06 TO 4.000E 07 EV		GH		52
IMP-J	(73-078A-06)	STONE					
ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....			R 5.000E 06 TO 4.000E 07 EV		GH		57
MJS 77A	(MARIN77A-07)	KRIMIGIS					
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....			R 5.000E 06 TO 3.000E 07 EV		H	6	78
MJS 77B	(MARIN77B-07)	KRIMIGIS					
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....			R 5.000E 06 TO 3.000E 07 EV		H	6	81
SOLRAD 11A	(SRD-11A-17)	DLAKE					
OMNIDIRECTIONAL PROTONS.....			R 5.000E 06 TO 5.000E 07 EV		GH		127
SOLRAD 11B	(SRD-11B-17)	DLAKE					
OMNIDIRECTIONAL PROTONS.....			R 5.000E 06 TO 5.000E 07 EV		GH		131
OVS-6	(69-046B-03)	YATES					
PHOTON ALPHA PARTICLE TELESCOPE.....			R 5.300E 06 TO 4.000E 07 EV		EEGH		95
PIONEER 6	(65-105A-03)	PAN					
COSMIC-RAY TELESCOPE.....			R 6.000E 06 TO 1.392E 07 EV		H		96
PIONEER 7	(66-075A-06)	SIMPSON					
COSMIC-RAY TELESCOPE.....			P 6.000E 06 TO 1.270E 07 EV		H		98
MJS 77A	(MARIN77A-08)	VOGT					
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....			R 6.000E 06 TO 3.000E 07 EV		H	6	79
MARINER 10	(73-085A-07)	SIMPSON					
ENERGETIC PARTICLES.....			R 6.000E 06 TO 6.000E 07 EV		H	12	77
IMP-H	(72-073A-07)	SIMPSON					
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT.....			R 6.000E 06 TO 6.000E 07 EV		GH		52
MJS 77B	(MARIN77B-08)	VOGT					
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....			R 6.000E 06 TO 3.000E 07 EV		H	6	82
IMP-J	(73-078A-07)	SIMPSON					
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS.....			R 6.000E 06 TO 6.000E 07 EV		GH		57
IMP-I	(71-019A-09)	SIMPSON					
NUCLEAR COMPOSITION OF COSMIC AND SOLAR PARTICLE RADIATIONS.....			R 7.000E 06 TO 2.000E 07 EV		GH		55
PIONEER 10	(72-012A-02)	SIMPSON					
CHARGED PARTICLE COMPOSITION.....			R 7.000E 06 TO 2.000E 07 EV		H	5	103
PIONEER 11	(73-019A-02)	SIMPSON					
CHARGED PARTICLE COMPOSITION.....			R 7.000E 06 TO 2.000E 07 EV		H	5	106
PIONEER 7	(66-075A-05)	MCCRACKEN					
COSMIC-RAY ANISOTROPY.....			P 7.200E 06 TO INFINITY		H		97

SATELLITE NAME	EXPERIMENT ID	EXPERIMENTER	R RANGE	OF	MEASUREMENTS REGION	PLANET	
DESCRIPTIVE EXPERIMENT TITLE			E MIN VALUE	(F OF E)	MAX ANCODEFGHI/712345H	6709	PAGE
			S MAX VALUE	(LAMBDA)	MIN		
2-2 SENSING PROTONS OR HYDROGEN IONS							
PIONEER 7	(66-075A-05)	MCCRACKEN	P 7.200E 06 TO 4.700E 07 EV		H		97
COSMIC-RAY ANISOTROPY.....							
PIONEER 6	(65-105A-05)	MCCRACKEN	P 7.400E 06 TO INFINITY		H		97
COSMIC-RAY ANISOTROPY.....							
PIONEER 8	(67-123A-05)	MCCRACKEN	P 7.400E 06 TO 5.300E 07 EV		H		99
COSMIC-RAY ANISOTROPY.....							
PIONEER 6	(65-105A-05)	MCCRACKEN	P 7.400E 06 TO 4.400E 07 EV		H		97
COSMIC-RAY ANISOTROPY.....							
PIONEER 9	(68-100A-05)	MCCRACKEN	P 7.400E 06 TO 6.300E 07 EV		H		101
COSMIC-RAY ANISOTROPY.....							
IMP-1	(71-019A-07)	BUSTROM	P 1.000E 07 TO INFINITY		FGH		53
MONITORING OF SOLAR PROTONS.....							
PIONEER 10	(72-012A-11)	VAN ALLEN	N 1.000E 07 TO INFINITY		H	5	104
JOVIAN CHARGED PARTICLES EXPERIMENT.....							
PIONEER 11	(73-019A-11)	VAN ALLEN	N 1.000E 07 TO INFINITY		H	5	106
JOVIAN CHARGED PARTICLES EXPERIMENT.....							
ATS 6	(74-030A-07)	PAULIKAS	R 1.000E 07 TO 8.000E 07 EV		F		30
OMNIDIRECTIONAL SPECTROMETER.....							
HELIOS-A	(HELI0-A-07)	KUNDW	R 1.000E 07 TO 1.000E 08 EV		H		46
COSMIC-RAY PARTICLES.....							
HELIOS-B	(HELI0-B-07)	KUNDW	R 1.000E 07 TO 1.000E 08 EV		H		48
COSMIC-RAY PARTICLES.....							
SMS-B	(SMS-B -01)	WILLIAMS	R 1.000E 07 TO 1.000E 08 EV		F		124
ENERGETIC PARTICLE MONITOR.....							
SMS-C	(SMS-C -02)	WILLIAMS	R 1.000E 07 TO 1.000E 08 EV		F		125
ENERGETIC PARTICLE MONITOR.....							
SOLRAD 11A	(SRD-11A-20)	KELLEY	R 1.000E 07 TO 1.000E 08 EV		GH		120
PHOTON-ALPHA TELESCOPE.....							
SOLRAD 110	(SRD-110-20)	KELLEY	R 1.000E 07 TO 1.000E 08 EV		GH		132
PHOTON-ALPHA TELESCOPE.....							
NOAA 2	(72-082A-01)	BUSTROM	P 1.000E 07 TO 6.000E 07 EV		BC		90
SOLAR PROTON MONITOR.....							
SESP 7A-2	(ST7A-2A-03)	KELLY	1.000E 07 TO 1.000E 08 EV		CD		121
LOW-ENERGY PARTICLE SENSORS (0.1-100MEV).....							
ISEE-A	(MOTHER -14)	SIMPSON	R 1.000E 07 TO 1.500E 08 EV		GH		61
MEDIUM-ENERGY COSMIC RAYS.....							
SOLRAD 11A	(SRD-11A-14)	BLAKE	R 1.000E 07 TO INFINITY		GH		127
SOLAR PROTONS.....							
SOLRAD 11A	(SRD-11A-23)	BLAKE	R 1.000E 07 TO INFINITY		GH		127
ANTISOLAR PROTONS.....							
SOLRAD 110	(SRD-11B-14)	BLAKE	R 1.000E 07 TO INFINITY		GH		130
SOLAR PROTONS.....							
PIONEER 9	(68-100A-06)	WOBBER	R 1.000E 07 TO 4.200E 07 EV		H		101
COSMIC-RAY TELESCOPE.....							
NOAA 3	(73-086A-01)	BUSTROM	P 1.000E 07 TO INFINITY		BC		90
SOLAR PROTON MONITOR.....							
SMS-A	(74-033A-02)	WILLIAMS	R 1.000E 07 TO 1.000E 08 EV		F		123
ENERGETIC PARTICLE MONITOR.....							
GOES-D	(GOES-B -02)	WILLIAMS	R 1.000E 07 TO 1.000E 08 EV		F		40
ENERGETIC PARTICLE MONITOR.....							
GOES-C	(GOES-C -02)	WILLIAMS	R 1.000E 07 TO 1.000E 08 EV		F		41
ENERGETIC PARTICLE MONITOR.....							
HELIOS-A	(HELI0-A-08)	TRAINOR	R 1.000E 07 TO 1.000E 08 EV		H		47
GALACTIC AND SOLAR COSMIC RAYS.....							
HELIOS-B	(HELI0-B-08)	TRAINOR	R 1.000E 07 TO 1.000E 08 EV		H		49
GALACTIC AND SOLAR COSMIC RAYS.....							
NOAA 4	(IT05-G -01)	BUSTROM	P 1.000E 07 TO INFINITY		BC		91
SOLAR PROTON MONITOR.....							
SOLRAD 110	(SRD-11B-23)	BLAKE	R 1.000E 07 TO INFINITY		GH		131
ANTISOLAR PROTONS.....							
IMP-1	(71-019A-09)	SIMPSON	R 1.100E 07 TO 6.700E 07 EV		GH		59
NUCLEAR COMPOSITION OF COSMIC AND SOLAR							
PARTICLE RADIATIONS.....							
PIONEER 8	(67-123A-06)	WEBER	R 1.100E 07 TO 6.400E 07 EV		H		99
COSMIC-RAY GRADIENT DETECTOR.....							
ATS 6	(69-069A-03)	MCILWAIN	R 1.200E 07 TO 2.400E 07 EV		F		28
OMNIDIRECTIONAL HIGH-ENERGY PARTICLE							
DETECTOR.....							
PIONEER 7	(66-075A-06)	SIMPSON	R 1.270E 07 TO 7.300E 07 EV		H		98
COSMIC-RAY TELESCOPE.....							
PIONEER 6	(65-105A-03)	FAN	R 1.340E 07 TO 7.320E 07 EV		H		96
COSMIC-RAY TELESCOPE.....							
IMP-H	(72-071A-00)	KRIBIGIS	R 1.400E 07 TO 1.400E 08 EV		GH		51
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....							
IT05-H	(IT05-H -04)	SHENK	R 1.500E 07 TO 1.500E 08 EV		C		71
SPACE ENVIRONMENTAL MONITOR (SEM).....							
IT05-I	(IT05-I -04)	UNKNOWN	R 1.500E 07 TO 1.500E 08 EV		C		72
SPACE ENVIRONMENTAL MONITOR (SEM).....							
IT05-J	(IT05-J -04)	UNKNOWN	R 1.500E 07 TO 1.500E 08 EV		C		73
SPACE ENVIRONMENTAL MONITOR (SEM).....							
IMP-1	(71-019A-08)	MCDONALD	R 1.870E 07 TO 8.160E 07 EV		FGH		54
SOLAR AND GALACTIC COSMIC-RAY STUDIES.....							
SESP 7A-2	(ST7A-2A-04)	KELLY	2.000E 07 TO 1.000E 08 EV		CD		121
PHOTON-ALPHA DETECTOR (20-100 MEV).....							
PIONEER 10	(72-012A-12)	MCDONALD	R 2.000E 07 TO 2.000E 08 EV		H	5	103
COSMIC-RAY SPECTRA.....							
PIONEER 11	(73-019A-12)	MCDONALD	R 2.000E 07 TO 2.000E 08 EV		H	5	105
COSMIC-RAY SPECTRA.....							
ATS 6	(74-030A-06)	HASLEY	R 2.000E 07 TO 3.000E 08 EV		F		29
SOLAR COSMIC RAYS AND GEOMAGNETICALLY							
TRAPPED RADIATION.....							
IMP-H	(72-073A-09)	MCDONALD	R 2.000E 07 TO 8.000E 07 EV		GH		51
SOLAR AND COSMIC-RAY PARTICLES.....							
IMP-J	(73-070A-09)	MCDONALD	R 2.000E 07 TO 8.000E 07 EV		GH		56
SOLAR AND COSMIC-RAY PARTICLES.....							
MARINER 10	(73-085A-07)	SIMPSON	P 2.000E 07 TO INFINITY		H	12	77
ENERGETIC PARTICLES.....							
VCLA 5A	(69-046D-07)	DAME	P 2.500E 07 TO INFINITY		GH		139
NEUTRON DETECTOR.....							

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

SATELLITE NAME	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS REGION	PLANET
DESCRIPTIVE EXPERIMENT TITLE	MIN VALUE (F OR S)	MAX ARCEFGHT/0123456	6789	PAGE
S MAX VALUE (LAMDA)	MIN			
2.2 SENDING PROTONS OR HYDROGEN IONS				
VELA 50	(69-046E-07)	NAME		
NEUTRON DETECTOR.....			P 2.500E 07 TO INFINITY	GH 140
VELA 6A	(70-027A-07)	NAME		
NEUTRON DETECTOR.....			P 2.500E 07 TO INFINITY	GH 141
VELA 6J	(70-027A-07)	NAME		
NEUTRON DETECTOR.....			P 2.500E 07 TO INFINITY	GH 142
NJS 77A	(MARN77A-08)	VOGT		
HIGH- AND MODERATELY LOW-ENERGY				
COSMIC-RAY TELESCOPE.....			R 3.000E 07 TO 5.000E 08 EV	H 6 5 79
NJS 77J	(MARN77J-08)	VOGT		
HIGH- AND MODERATELY LOW-ENERGY				
COSMIC-RAY TELESCOPE.....			R 3.000E 07 TO 5.000E 08 EV	H 6 5 82
IMP-I	(71-019A-07)	BOSTROM		
MONITORING OF SOLAR PROTONS.....			P 3.000E 07 TO INFINITY	FGH 53
ISEE-C	(HELOCTR-05)	HECKMAN		
HIGH-ENERGY COSMIC RAYS.....			R 3.100E 07 TO 1.100E 08 EV	H 64
ISEE-C	(HELOCTR-05)	HECKMAN		
HIGH-ENERGY COSMIC RAYS.....			R 3.100E 07 TO 1.100E 08 EV	H 64
ISEE-C	(HELOCTR-06)	MEYER		
COSMIC-RAY ELECTRONS AND NUCLEI.....			R 3.600E 07 TO 3.600E 08 EV	H 64
QV5-6	(69-046H-03)	YATES		
PROTON ALPHA PARTICLE TELESCOPE.....			R 4.000E 07 TO 1.000E 08 EV	EFGH 95
PIONEER 9	(68-100A-06)	WEDDER		
COSMIC-RAY TELESCOPE.....			R 4.200E 07 TO 3.200E 08 EV	H 101
PIONEER 6	(65-105A-05)	MC CRACKEN		
COSMIC-RAY ANISOTROPY.....			P 4.400E 07 TO 7.700E 07 EV	H 97
PIONEER 7	(66-075A-05)	MC CRACKEN		
COSMIC-RAY ANISOTROPY.....			P 4.700E 07 TO 6.500E 07 EV	H 97
ISEE-A	(HOTTER -1A)	SIMPSON		
MEDIUM-ENERGY COSMIC RAYS.....			R 5.000E 07 TO 1.500E 08 EV	GH 61
SOLRAD 11A	(SR0-11A-17)	BLAKE		
OMNIDIRECTIONAL PROTONS.....			R 5.000E 07 TO 1.600E 08 EV	GH 127
SOLRAD 11B	(SR0-11B-17)	BLAKE		
OMNIDIRECTIONAL PROTONS.....			R 5.000E 07 TO 1.600E 08 EV	GH 131
PIONEER 10	(72-012A-02)	SIMPSON		
CHARGED PARTICLE COMPOSITION.....			R 5.000E 07 TO INFINITY	H 5 103
PIONEER 11	(73-019A-02)	SIMPSON		
CHARGED PARTICLE COMPOSITION.....			R 5.000E 07 TO INFINITY	H 5 106
PIONEER 10	(72-012A-05)	FILLIUS		
JOVIAN TRAPPED RADIATION.....			P 6.000E 07 TO 2.500E 08 EV	H 5 102
PIONEER 11	(71-019A-05)	FILLIUS		
JOVIAN TRAPPED RADIATION.....			P 6.000E 07 TO 2.500E 08 EV	H 5 105
NOAA 3	(73-086A-01)	ROSTROM		
SOLAR PROTON MONITOR.....			R 6.000E 07 TO INFINITY	BC 90
NOAA 4	(1705-G -71)	BOSTROM		
SOLAR PROTON MONITOR.....			R 6.000E 07 TO INFINITY	BC 91
NOAA 2	(72-082A-01)	ROSTROM		
SOLAR PROTON MONITOR.....			R 6.000E 07 TO INFINITY	BC 90
MAHNER 10	(73-005A-07)	SIMPSON		
ENERGETIC PARTICLES.....			R 6.000E 07 TO INFINITY	H 12 77
IMP-H	(72-073A-07)	SIMPSON		
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z				
ISOTYPE EXPERIMENT.....			R 6.000E 07 TO 6.000E 08 EV	GH 52
IMP-I	(71-019A-07)	BOSTROM		
MONITORING OF SOLAR PROTONS.....			P 6.000E 07 TO INFINITY	FGH 53
IMP-J	(73-078A-07)	SIMPSON		
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z				
EXPERIMENTS.....			R 6.000E 07 TO 6.000E 08 EV	GH 57
PIONEER 8	(67-123A-06)	WEDDER		
COSMIC-RAY GRADIENT DETECTOR.....			R 6.400E 07 TO 1.100E 08 EV	H 99
PIONEER 7	(66-075A-05)	MC CRACKEN		
COSMIC-RAY ANISOTROPY.....			P 6.500E 07 TO 8.100E 07 EV	H 97
IMP-I	(71-019A-09)	SIMPSON		
NUCLEAR COMPOSITION OF COSMIC AND SOLAR				
PARTICLE RADIATIONS.....			R 6.700E 07 TO 2.000E 08 EV	GH 55
PIONEER 7	(66-075A-06)	SIMPSON		
COSMIC-RAY TELESCOPE.....			R 7.300E 07 TO 1.600E 08 EV	H 98
PIONEER 6	(65-105A-03)	FAN		
COSMIC-RAY TELESCOPE.....			R 7.320E 07 TO 1.750E 08 EV	H 96
IMP-H	(72-073A-09)	MCDONALD		
SOLAR AND COSMIC-RAY PARTICLES.....			R 8.000E 07 TO 5.000E 08 EV	GH 51
IMP-J	(73-078A-09)	MCDONALD		
SOLAR AND COSMIC-RAY PARTICLES.....			R 8.000E 07 TO 5.000E 08 EV	GH 50
IMP-I	(71-019A-08)	MCDONALD		
SOLAR AND GALACTIC COSMIC-RAY STUDIES.....			R 8.000E 07 TO 5.000E 08 EV	FGH 54
HELIOS-A	(HELIO-A-07)	KUNDW		
COSMIC-RAY PARTICLES.....			R 1.000E 08 TO 1.000E 09 EV	H 46
HELIOS-B	(HELIO-B-07)	KUNDW		
COSMIC-RAY PARTICLES.....			R 1.000E 08 TO 1.000E 09 EV	H 40
SMS-B	(SMS-B -71)	WILLIAMS		
ENERGETIC PARTICLE MONITOR.....			R 1.000E 08 TO 5.000E 08 EV	F 124
SMS-C	(SMS-C -02)	WILLIAMS		
ENERGETIC PARTICLE MONITOR.....			R 1.000E 08 TO 5.000E 08 EV	F 125
SMS-A	(76-033A-02)	WILLIAMS		
ENERGETIC PARTICLE MONITOR.....			R 1.000E 08 TO 5.000E 08 EV	F 123
GOES-B	(GOES-B -02)	WILLIAMS		
ENERGETIC PARTICLE MONITOR.....			R 1.000E 08 TO 5.000E 08 EV	F 47
GOES-C	(GOES-C -12)	WILLIAMS		
ENERGETIC PARTICLE MONITOR.....			R 1.000E 08 TO 5.000E 08 EV	F 41
HELIOUS-A	(HELIO-A-08)	TRAINOR		
GALACTIC AND SOLAR COSMIC RAYS.....			R 1.000E 08 TO 8.000E 08 EV	H 47
HELIOUS-B	(HELIO-B-08)	TRAINOR		
GALACTIC AND SOLAR COSMIC RAYS.....			R 1.000E 08 TO 8.000E 08 EV	H 49
ITOS-H	(ITOS-H -04)	SHENK		
SPACE ENVIRONMENTAL MONITOR (SEM).....			R 1.500E 08 TO 1.000E 09 EV	C 71
ITOS-I	(ITOS-I -04)	UNKNOWN		
SPACE ENVIRONMENTAL MONITOR (SEM).....			R 1.500E 08 TO 1.000E 09 EV	C 72
ITOS-J	(ITOS-J -04)	UNKNOWN		
SPACE ENVIRONMENTAL MONITOR (SEM).....			R 1.500E 08 TO 1.000E 09 EV	C 73

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MEASUREMENTS		OF (F OR E) (WAVELENGTH)	REGION MAX MIN	PLANET ABCDEFGHIJ0123456789	PAGE
			MIN VALUE	MAX VALUE				
2.2 SENSING PROTONS OR HYDROGEN IONS								
PIONEER 7 COSMIC-RAY TELESCOPE.....	(66-075A-06)	SIMPSON	R	1.650E 06	TO INFINITY		H	98
PIONEER 6 COSMIC-RAY TELESCOPE.....	(65-105A-03)	FAN	R	1.750E 08	TO INFINITY		H	96
PIONEER 10 COSMIC-RAY SPECTRA.....	(72-012A-12)	MCDONALD	P	2.000E 08	TO 8.000E 08 EV		H	5 103
PIONEER 11 COSMIC-RAY SPECTRA.....	(73-019A-12)	MCDONALD	P	2.000E 08	TO 8.000E 08 EV		H	5 105
PIONEER 8 COSMIC-RAY GRADIENT DETECTOR.....	(67-123A-06)	WEDDER	R	2.400E 08	TO 2.200E 09 EV		H	99
PIONEER 9 COSMIC-RAY TELESCOPE.....	(68-100A-06)	WEDDER	R	3.200E 08	TO 2.200E 09 EV		H	101
ISEE-C COSMIC-RAY ELECTRONS AND NUCLEI.....	(HELOCTR-06)	MEYER	R	3.600E 08	TO 3.600E 09 EV		H	64
IMP-H SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT.....	(72-073A-07)	SIMPSON	R	6.000E 08	TO 1.200E 09 EV		GH	52
IMP-J SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS.....	(73-070A-07)	SIMPSON	R	6.000E 08	TO 1.200E 09 EV		GH	57
CORSA COSMIC HEAVY PRIMARY PARTICLES.....	(CORSA -02)	OGA	R	3.000E 09	TO 6.000E 09 EV		H	31
ISEE-C COSMIC-RAY ELECTRONS AND NUCLEI.....	(HELOCTR-06)	MEYER	R	3.600E 09	TO 1.300E 10 EV		H	64
ISEE-C COSMIC-RAY ELECTRONS AND NUCLEI.....	(HELOCTR-06)	MEYER	R	1.300E 10	TO INFINITY		H	64
2.3 SENSING HELIUM NUCLEI								
53-2 PROTON-ALPHA PARTICLE DETECTOR.....	(5773-8A-05)	MOOREY					C	117
IMP-J MEASUREMENT OF SOLAR PLASMA.....	(73-078A-02)	BRIDGE	P	2.500E 01	TO 3.500E 03 EV		GH	65
IMP-H MEASUREMENT OF SOLAR PLASMA.....	(72-073A-02)	BRIDGE	P	5.000E 01	TO 7.000E 03 EV		GH	50
PIONEER 11 PLASMA EXPERIMENT.....	(73-019A-13)	WOLFF	P	5.000E 01	TO 9.000E 03 EV		H	5 107
PIONEER 10 PLASMA EXPERIMENT.....	(72-012A-13)	WOLFF	P	1.000E 02	TO 1.800E 04 EV		H	5 104
IMP-I MEASUREMENT OF SOLAR PLASMA.....	(71-019A-11)	BAKE	R	1.000E 02	TO 8.000E 03 EV		DEFGH	53
VELA 6A SOLAR WIND EXPERIMENT.....	(70-027A-05)	BAKE	R	1.200E 02	TO 5.000E 03 EV		H	141
HELIO5-A PLASMA DETECTORS.....	(HELIO5-A-09)	ROSENBAUER	P	1.500E 02	TO 8.000E 03 EV		H	47
HELIO5-B PLASMA DETECTORS.....	(HELIO5-B-09)	ROSENBAUER	P	1.500E 02	TO 8.000E 03 EV		H	49
IMP-H MEASUREMENT OF SOLAR PLASMA.....	(72-073A-10)	BAKE	R	2.000E 02	TO 2.000E 04 EV		GH	50
IMP-H SOLAR WIND ION COMPOSITION.....	(72-073A-12)	OGILVIE	R	3.000E 02	TO 3.750E 03 EV		GH	51
IMP-H SOLAR WIND ION COMPOSITION.....	(72-073A-12)	OGILVIE	R	4.000E 02	TO 3.750E 03 EV		H	51
SESP 74-2 HYDROGEN-HELIUM MASS SPECTROMETER (HE+ AND H+ 10-60 KEV, PROTONS 0.2-100 KEV).....	(5774-2A-08)	FENNELL		2.500E 03	TO 2.000E 04 EV		C3	121
MJS 77A LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....	(MARN77A-07)	KRIMIGIS	P	5.000E 04	TO 5.000E 05 EV		H 6 5	70
MJS 77B LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....	(MARN77B-07)	KRIMIGIS	R	5.000E 04	TO 5.000E 05 EV		H 6 5	81
IMP-H IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV.....	(72-073A-03)	GLOECKLER	R	9.000E 04	TO 5.000E 05 EV		GH	51
IMP-J ENERGETIC ELECTRONS AND PROTONS.....	(73-070A-09)	WILLIAMS	R	1.200E 05	TO 5.500E 05 EV		GH	57
IMP-H ENERGETIC ELECTRONS AND PROTONS.....	(72-073A-05)	WILLIAMS	R	1.200E 05	TO 5.500E 05 EV		GH	52
ATS 6 SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION.....	(74-039A-06)	MASLEY	R	3.000E 05	TO 3.000E 06 EV		F	23
ISEE-C ENERGETIC PROTONS.....	(HELOCTR-08)	DE FEITER	R	3.500E 05	TO 1.500E 06 EV		H	64
IMP-H ENERGETIC ELECTRONS AND PROTONS.....	(72-073A-05)	WILLIAMS	R	5.000E 05	TO 2.200E 06 EV		GH	52
VELA 5B SOLAR PARTICLE TELESCOPES.....	(69-046E-03)	SINGER	R	5.000E 05	TO 2.500E 06 EV		GH	140
VELA 6A SOLAR PARTICLE TELESCOPES.....	(70-027A-03)	SINGER	R	5.000E 05	TO 2.500E 06 EV		GH	141
VELA 6B SOLAR PARTICLE TELESCOPES.....	(70-027D-03)	SINGER	R	5.000E 05	TO 2.500E 06 EV		GH	142
ISEE-C SOLAR AND GALACTIC ENERGETIC PARTICLES.....	(HELOCTR-04)	VON ROSENING	R	5.000E 05	TO 5.000E 06 EV		H	65
IMP-H ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....	(72-073A-06)	STONE	R	5.000E 05	TO 5.000E 06 EV		GH	52
IMP-J ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....	(73-078A-06)	STONE	R	5.000E 05	TO 5.000E 06 EV		GH	57

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID	EXPERIMENTER	RANGE OF MIN VALUE (F OR S) S MAX VALUE (LAMDA)	MEASUREMENTS (F OR S) (LAMDA)	REGION MAX ACODE	PLANET GH1/012345M 6789	PAGE
2.3 SENSING HELIUM NUCLEI							
IMP-J ENERGETIC ELECTRONS AND PHOTONS.....	(73-070A-05)	WILLIAMS	R 5.000E 05 TO 2.200E 06 EV		GH		57
ISCR-A MEDIUM-ENERGY COSMIC RAYS.....	(MUTHER -14)	SIMPSON	R 5.000E 05 TO 5.000E 06 EV		GH		61
MJS 77A LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....	(MARN77A-07)	KRINIGIS	R 5.000E 05 TO 5.000E 06 EV		H 6	5	78
MJS 77B LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....	(MARN77B-07)	KRINIGIS	R 5.000E 05 TO 5.000E 06 EV		H 6	5	81
IMP-H ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....	(72-073A-06)	STONE	R 5.000E 05 TO 4.000E 07 EV		GH		52
IMP-J ELECTRONS AND HYDROGEN AND HELIUM ISOTOPES.....	(73-070A-06)	STONE	R 5.000E 05 TO 4.000E 07 EV		GH		57
PIONEER 8 COSMIC-RAY TELESCOPE.....	(65-105A-03)	PAN	R 6.000E 05 TO 6.000E 06 EV		H		96
PIONEER 7 COSMIC-RAY TELESCOPE.....	(66-079A-06)	SIMPSON	R 6.000E 05 TO 1.300E 07 EV		H		98
IMP-H CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....	(72-073A-00)	KRINIGIS	R 6.400E 05 TO 4.500E 06 EV		GH		51
SOLRAD 11A ANTISOLAR PROTONS.....	(SRD-11A-23)	BLAKE	R 1.000E 06 TO 2.000E 06 EV		GH		127
SOLRAD 11A SOLAR PROTONS.....	(SRD-11A-14)	BLAKE	R 1.000E 06 TO 2.000E 06 EV		GH		127
SOLRAD 11B SOLAR PROTONS.....	(SRD-11B-14)	BLAKE	R 1.000E 06 TO 2.000E 06 EV		GH		130
HELIOS-A COSMIC-RAY PARTICLES.....	(HELIOS-A-07)	KUNOW	R 1.000E 06 TO 1.000E 07 EV		H		46
HELIOS-B COSMIC-RAY PARTICLES.....	(HELIOS-B-07)	KUNOW	R 1.000E 06 TO 1.000E 07 EV		H		48
SOLRAD 11B ANTISOLAR PROTONS.....	(SRD-11B-23)	BLAKE	R 1.000E 06 TO 2.000E 06 EV		GH		131
SOLRAD 11A SOLAR PROTONS.....	(SRD-11A-14)	BLAKE	R 2.000E 06 TO INFINITY		GH		127
SOLRAD 11B SOLAR PROTONS.....	(SRD-11B-14)	BLAKE	R 2.000E 06 TO INFINITY		GH		130
SOLRAD 11A ANTISOLAR PROTONS.....	(SRD-11A-23)	BLAKE	R 2.000E 06 TO INFINITY		GH		127
SOLRAD 11B ANTISOLAR PROTONS.....	(SRD-11B-23)	BLAKE	R 2.000E 06 TO INFINITY		GH		131
IMP-I MONITORING OF SOLAR PROTONS.....	(71-019A-07)	BOSTROM	R 2.000E 06 TO 5.000E 06 EV		FGH		53
IMP-J CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....	(73-070A-00)	KRINIGIS	P 2.000E 06 TO 2.000E 08 EV		GH		56
IMP-H ENERGETIC ELECTRONS AND PHOTONS.....	(72-073A-05)	WILLIAMS	R 2.200E 06 TO 8.800E 06 EV		GH		52
IMP-J ENERGETIC ELECTRONS AND PHOTONS.....	(73-070A-05)	WILLIAMS	R 2.200E 06 TO 8.800E 06 EV		GH		57
SOLRAD 11A PROTON-ALPHA TELESCOPE.....	(SRD-11A-20)	KELLEY	R 2.500E 06 TO 2.500E 07 EV		GH		120
SOLRAD 11B PROTON-ALPHA TELESCOPE.....	(SRD-11B-20)	KELLEY	R 2.500E 06 TO 2.500E 07 EV		GH		132
DVS-6 PROTON ALPHA PARTICLE TELESCOPE.....	(69-046B-03)	YATES	R 2.500E 06 TO 2.500E 07 EV		EFGH		95
VELA 5B SOLAR PARTICLE TELESCOPES.....	(69-046E-03)	SINGER	R 2.500E 06 TO 2.500E 07 EV		GH		140
VELA 6A SOLAR PARTICLE TELESCOPES.....	(70-027A-03)	SINGER	R 2.500E 06 TO 2.500E 07 EV		GH		141
VELA 6B SOLAR PARTICLE TELESCOPES.....	(70-027B-03)	SINGER	R 2.500E 06 TO 2.500E 07 EV		GH		142
NOAA 4 SOLAR PROTON MONITOR.....	(1705-G-01)	BOSTROM	R 3.000E 06 TO 8.000E 06 EV		BC		91
NOAA 3 SOLAR PROTON MONITOR.....	(73-086A-01)	BOSTROM	R 3.000E 06 TO 8.000E 06 EV		BC		90
NOAA 2 SOLAR PROTON MONITOR.....	(72-082A-01)	BOSTROM	R 3.000E 06 TO 1.000E 07 EV		BC		90
ATS 8 SOLAR COSMIC RAYS AND GEOMAGNETICALLY TRAPPED RADIATION.....	(74-039A-06)	MASLEY	R 3.000E 06 TO 4.500E 07 EV		F		29
SMS-A ENERGETIC PARTICLE MONITOR.....	(74-033A-02)	WILLIAMS	R 4.000E 06 TO 4.000E 07 EV		F		123
GDES-B ENERGETIC PARTICLE MONITOR.....	(GDES-B-02)	WILLIAMS	R 4.000E 06 TO 4.000E 07 EV		F		40
GDES-C ENERGETIC PARTICLE MONITOR.....	(GDES-C-02)	WILLIAMS	R 4.000E 06 TO 4.000E 07 EV		F		41
SMS-B ENERGETIC PARTICLE MONITOR.....	(SMS-B-01)	WILLIAMS	R 4.000E 06 TO 4.000E 07 EV		F		124
SMS-C ENERGETIC PARTICLE MONITOR.....	(SMS-C-02)	WILLIAMS	R 4.000E 06 TO 4.000E 07 EV		F		125
PIONEER 8 COSMIC-RAY ANISOTROPY.....	(67-127A-05)	MCCRACKEN	R 4.000E 06 TO 8.000E 06 EV		H		99
PIONEER 9 COSMIC-RAY ANISOTROPY.....	(68-100A-05)	MCCRACKEN	R 4.000E 06 TO 8.000E 06 EV		H		101
ISEE-C SOLAR AND GALACTIC ENERGETIC PARTICLES.....	(HELOCTR-04)	VON ROSENVING	R 4.000E 06 TO 8.000E 07 EV		H		65
IMP-H CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....	(72-073A-00)	KRINIGIS	R 4.500E 06 TO 5.200E 07 EV		GH		51
ALOUETTE 2 ENERGETIC PARTICLES DETECTORS.....	(65-098A-04)	MCDIARMID	R 5.000E 06 TO 2.400E 07 EV		BC		20
SESP 7A-2 PHOTON-ALPHA DETECTOR.....	(ST7A-2A-04)	KELLY	5.000E 06 TO 2.500E 07 EV		CD		121
SOLRAD 11A OMNIDIRECTIONAL PROTONS.....	(SRD-11A-17)	BLAKE	R 5.000E 06 TO 5.000E 07 EV		GH		127
SOLRAD 11B OMNIDIRECTIONAL PROTONS.....	(SRD-11B-17)	BLAKE	R 5.000E 06 TO 5.000E 07 EV		GH		131

SATELLITE NAME	EXPERIMENT ID	EXPERIMENT-R	R RANGE OF MEASUREMENTS	REGION	PLANET
DESCRIPTIVE EXPERIMENT TITLE			MIN VALUE (F OF E)	MAX	ABCOEFGHI/012145H
			MIN	MAX	6769 PAGE
2.3 SENSING HELIUM NUCLEI					
IMP-H	(72-073A-06)	STONE			
ELECTRONS AND HYDROGEN AND HELIUM					
ISOTOPES.....			R 5.000E 06 TO 4.000E 07 EV	GH	52
IMP-J	(73-070A-06)	STONE			
ELECTRONS AND HYDROGEN AND HELIUM					
ISOTOPES.....			R 5.000E 06 TO 4.000E 07 EV	GH	57
ISEE-A	(MOTHER -14)	SIMPSON			
MEDIUM-ENERGY COSMIC RAYS.....			R 5.000E 06 TO 5.000E 07 EV	GH	61
MJS 77A	(MANN77A-07)	KRINIGIS			
LOW-ENERGY CHARGED PARTICLE ANALYZER AND					
TELESCOPE.....			R 5.000E 06 TO 3.000E 07 EV	H 6 5	70
MJS 77B	(MANN77B-07)	KRINIGIS			
LOW-ENERGY CHARGED PARTICLE ANALYZER AND					
TELESCOPE.....			R 5.000E 06 TO 3.000E 07 EV	H 6 5	81
PIONEER 9	(68-100A-06)	WEDRER			
COSMIC-RAY TELESCOPE.....			R 5.000E 06 TO 4.200E 07 EV	H	101
IMP-J	(73-070A-07)	SIMPSON			
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z					
EXPERIMENTS.....			R 6.000E 06 TO 6.000E 07 EV	GH	57
PIONEER 6	(65-105A-03)	FAN			
COSMIC-RAY TELESCOPE.....			P 6.000E 06 TO 1.390E 07 EV	H	76
IMP-H	(72-073A-07)	SIMPSON			
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z					
ISOTOPE EXPERIMENT.....			R 6.000E 06 TO 6.000E 07 EV	GH	52
PIONEER 8	(67-123A-06)	WEBER			
COSMIC-RAY GRADIENT DETECTOR.....			P 6.600E 06 TO 6.400E 07 EV	H	99
PIONEER 10	(72-012A-02)	SIMPSON			
CHARGED PARTICLE COMPOSITION.....			R 7.000E 06 TO 2.000E 07 EV	H 5	103
PIONEER 11	(73-019A-02)	SIMPSON			
CHARGED PARTICLE COMPOSITION.....			R 7.000E 06 TO 2.000E 07 EV	H 5	106
HELIOS-A	(HELIO-A-07)	KUNDW			
COSMIC-RAY PARTICLES.....			R 1.000E 07 TO 1.000E 08 EV	H	46
HELIOS-B	(HELIO-B-07)	KUNDW			
COSMIC-RAY PARTICLES.....			R 1.000E 07 TO 1.000E 08 EV	H	48
ISEE-A	(MOTHER -14)	SIMPSON			
MEDIUM-ENERGY COSMIC RAYS.....			R 1.000E 07 TO 1.500E 08 EV	GH	61
PIONEER 7	(66-075A-06)	SIMPSON			
COSMIC-RAY TELESCOPE.....			R 1.300E 07 TO 7.000E 07 EV	H	98
PIONEER 6	(65-105A-03)	FAN			
COSMIC-RAY TELESCOPE.....			R 1.390E 07 TO 7.320E 07 EV	H	96
ISEE-C	(HELOCTR-05)	HECKMAN			
HIGH-ENERGY COSMIC RAYS.....			R 3.000E 07 TO 1.000E 08 EV	H	64
ISEE-C	(HELOCTR-05)	HECKMAN			
HIGH-ENERGY COSMIC RAYS.....			R 3.000E 07 TO 1.000E 08 EV	H	64
PIONEER 6	(65-105A-05)	MCCRACKEN			
COSMIC-RAY ANISOTROPY.....			R 3.100E 07 TO 7.600E 07 EV	H	97
SMS-A	(74-033A-02)	WILLIAMS			
ENERGETIC PARTICLE MONITOR.....			R 4.000E 07 TO 4.000E 08 EV	F	123
GOES-B	(GOES-B -02)	WILLIAMS			
ENERGETIC PARTICLE MONITOR.....			R 4.000E 07 TO 4.000E 08 EV	F	40
GOES-C	(GOES-C -02)	WILLIAMS			
ENERGETIC PARTICLE MONITOR.....			R 4.000E 07 TO 4.000E 08 EV	F	41
SMS-B	(SMS-B -01)	WILLIAMS			
ENERGETIC PARTICLE MONITOR.....			R 4.000E 07 TO 4.000E 08 EV	F	124
SMS-C	(SMS-C -02)	WILLIAMS			
ENERGETIC PARTICLE MONITOR.....			R 4.000E 07 TO 4.000E 08 EV	F	125
SOLRAD 11A	(SRD-11A-17)	BLAKE			
OMNIDIRECTIONAL PROTONS.....			R 5.000E 07 TO 1.200E 08 EV	GH	127
SOLRAD 11B	(SRD-11B-17)	BLAKE			
OMNIDIRECTIONAL PROTONS.....			R 5.000E 07 TO 1.200E 08 EV	GH	131
ISEE-A	(MOTHER -14)	SIMPSON			
MEDIUM-ENERGY COSMIC RAYS.....			R 5.000E 07 TO 1.500E 08 EV	GH	61
IMP-J	(73-070A-07)	SIMPSON			
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z					
EXPERIMENTS.....			R 6.000E 07 TO 6.000E 08 EV	GH	57
IMP-H	(72-073A-07)	SIMPSON			
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z					
ISOTOPE EXPERIMENT.....			R 6.000E 07 TO 6.000E 08 EV	GH	52
IMP-I	(71-019A-09)	SIMPSON			
NUCLEAR COMPOSITION OF COSMIC AND SOLAR					
PARTICLE RADIATIONS.....			R 7.000E 07 TO 2.000E 08 EV	GH	55
IMP-I	(71-019A-09)	SIMPSON			
NUCLEAR COMPOSITION OF COSMIC AND SOLAR					
PARTICLE RADIATIONS.....			R 7.000E 07 TO 2.000E 07 EV	GH	55
PIONEER 7	(66-075A-06)	SIMPSON			
COSMIC-RAY TELESCOPE.....			R 7.000E 07 TO 1.780E 08 EV	H	98
PIONEER 6	(65-105A-03)	FAN			
COSMIC-RAY TELESCOPE.....			R 7.320E 07 TO 1.750E 08 EV	H	96
HELIOS-A	(HELIO-A-07)	KUNDW			
COSMIC-RAY PARTICLES.....			R 1.000E 08 TO 1.000E 09 EV	H	46
HELIOS-B	(HELIO-B-07)	KUNDW			
COSMIC-RAY PARTICLES.....			R 1.000E 08 TO 1.000E 09 EV	H	48
IMP-J	(73-070A-07)	SIMPSON			
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z					
EXPERIMENTS.....			R 6.000E 08 TO 1.200E 09 EV	GH	57
IMP-H	(72-073A-07)	SIMPSON			
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z					
ISOTOPE EXPERIMENT.....			R 6.000E 08 TO 1.200E 09 EV	GH	52
CORSA	(CORSA -02)	ODA			
COSMIC HEAVY PRIMARY PARTICLES.....			R 3.000E 09 TO 6.000E 09 EV	3	31

SATELLITE NAME DESCRIPTIVE EXPERIMENT TITLE	EXPERIMENT ID EXPERIMENT TITLE	EXPERIMENTER	RANGE OF MEASUREMENTS REGION		PLANET ABCODEFGHIJ012345H 6789	PAGE
			E MIN VALUE S MAX VALUE	(F OR G) (LAMBDA)		
2.4 SENSING OTHER PARTICLE SPECIES						
ALOUETTE 2	(66-098A-05)	BRACE	R THERMAL ENERGIES	C		19
CYLINDRICAL ELECTROSTATIC PROBE						
ISIS 1	(69-009A-07)	BRACE	R THERMAL ENERGIES	C		66
CYLINDRICAL ELECTROSTATIC PROBE						
ISIS 2	(71-024A-06)	HOFFMAN	R THERMAL ENERGIES	BC		69
ION MASS SPECTROMETER						
ISIS 2	(71-024A-08)	MAIER	P THERMAL ENERGIES	C		69
RETARDING POTENTIAL ANALYZER						
APOLLO 15 LM/ALSEP	(71-063C-09)	DATES	N	H	H	23
LUNAR DUST DETECTOR						
PIONEER 10	(72-012A-10)	KLIJORE	N THERMAL ENERGIES		5	103
S-BAND OCCULTATION						
PIONEER 11	(73-019A-10)	KLIJORE	N THERMAL ENERGIES		5	105
S-BAND OCCULTATION						
AEROS 2	(74-055A-01)	KRANKOWSKY	R THERMAL ENERGIES	BC		18
MASS SPECTROMETER (MS)						
AEROS 2	(74-055A-02)	SPENNER				
ENERGY DISTRIBUTION OF IONS AND ELECTRONS			N THERMAL ENERGIES	C		19
AF-D	(AF-D -01)	BRACE	N THERMAL ENERGIES	C		11
ELECTRON TEMPERATURE AND CONCENTRATION						
EXOS-A	(EXOS-A -01)	UNKNOWN	R THERMAL ENERGIES	C		36
IONOSPHERIC PROBES						
EXOS-B	(EXOS-B -01)	UNKNOWN	N THERMAL ENERGIES	DE		37
MAGNETOSPHERIC PLASMA PROBE						
EXOS-C	(EXOS-C -04)	UNKNOWN	U	B		37
ENERGETIC PARTICLES						
ISS	(ISS -04)	FUGONO	R THERMAL ENERGIES	BC		70
ION MASS SPECTROMETER						
MJS 77B	(MARN77B-02)	ESHELMAN	R THERMAL ENERGIES		6	5 00
RADIO SCIENCE TEAM					H	6 5 00
MJS 77B	(MARN77B-06)	BRIDGE	N			
PLASMA					F H	61
ISEE-A	(MOTHER -12)	SHARP	R THERMAL ENERGIES			
PLASMA COMPOSITION					2	111
PIONEER VENUS ORBITER BUS	(P1078PA-02)	TAYLOR, JR.	R THERMAL ENERGIES			
ION MASS SPECTROMETER						
SRATS	(SRATS -07)	FUGONO	R THERMAL ENERGIES	B		136
IONIC COMPOSITION						
S3-2	(S773-6A-11)	MARCOS				
DYNAMICS OF POLAR ATMOSPHERE AND IONOSPHERE			R	C		116
S3-2	(S773-6A-13)	WILDMAN	R	C		118
RETARDING POTENTIAL ANALYZER						
VIKING-B LANDER	(VIK-B-12)	NIER	P THERMAL ENERGIES		4	147
ENTRY-ATMOSPHERIC COMPOSITION						
ISIS 1	(69-009A-08)	SAGALYN	U THERMAL ENERGIES	BC		67
SPHERICAL ELECTROSTATIC ANALYZER						
ISIS 2	(71-024A-07)	BRACE	N THERMAL ENERGIES	C		68
CYLINDRICAL ELECTROSTATIC PROBE						
AF-C	(73-101A-01)	BRACE	N THERMAL ENERGIES	C		8
ELECTRON TEMPERATURE AND CONCENTRATION						
AF-C	(73-101A-04)	HANSON	N THERMAL ENERGIES	C		9
ION TEMPERATURE						
AF-C	(73-101A-10)	HOFFMAN	R THERMAL ENERGIES	BC		9
MAGNETIC ION-MASS SPECTROMETER						
AE-C	(73-101A-11)	BRINTON	R THERMAL ENERGIES	BC		8
BENNETT ION-MASS SPECTROMETER						
AE-D	(AE-D -04)	HANSON	N THERMAL ENERGIES	C		12
ION TEMPERATURE						
AE-D	(AE-D -10)	HOFFMAN	R THERMAL ENERGIES	BC		12
ION COMPOSITION AND CONCENTRATION						
AE-E	(AE-E -01)	BRACE	N THERMAL ENERGIES	B		15
ELECTRON TEMPERATURE AND CONCENTRATION						
AE-E	(AE-E -04)	HANSON	N THERMAL ENERGIES	B		15
ION TEMPERATURE						
AE-E	(AE-E -10)	BRINTON	R THERMAL ENERGIES	B		15
ION COMPOSITION AND CONCENTRATION						
EXOS-A	(EXOS-A -01)	UNKNOWN	R THERMAL ENERGIES	C		36
IONOSPHERIC PROBES						
ISS	(ISS -03)	MIYAZAKI	R THERMAL ENERGIES	B		70
RETARDING POTENTIAL PROBE						
MJS 77A	(MARN77A-06)	BRIDGE	N		H	6 5 77
PLASMA						
PIONEER VENUS ORBITER	(P1078OR-07)	KNUDSEN	R		2	108
RETARDING POTENTIAL ANALYZER						
SRATS	(SRATS -06)	MIYAZAKI	R	B		135
PLASMA DIAGNOSIS						
SESP 73-5	(S773-6A-05)	PRAG	R	C		121
ELECTROSTATIC ANALYZER						
S3-2	(S773-6A-09)	SHIDDY	R	C		117
ELECTROSTATIC ANALYZER						
VIKING-A LANDER	(VIK-A-11)	MICHAEL, JR.	N		H	4 143
RADIO SCIENCE						
VIKING-A LANDER	(VIK-A-12)	NIER	P THERMAL ENERGIES		4	144
ENTRY-ATMOSPHERIC COMPOSITION						
VIKING-B LANDER	(VIK-B-11)	MICHAEL, JR.	N		H	4 146
RADIO SCIENCE						
MJS 77A	(MARN77A-02)	ESHELMAN	R		6	5 78
RADIO SCIENCE TEAM						
APOLLO 12 LM/ALSEP	(69-099C-05)	FREEMAN	R 2.000E-01 TO 4.060E 01 EV	GH		21
SUPRATHERMAL ION DETECTOR						
APOLLO 14 LM/ALSEP	(71-000C-06)	FREEMAN	P 2.000E-01 TO 4.060E 01 EV	GH		22
SUPRATHERMAL ION DETECTOR						
APOLLO 15 LM/ALSEP	(71-063C-05)	FREEMAN	P 2.000E-01 TO 4.060E 01 EV	GH	H	23
SUPRATHERMAL ION DETECTOR						
ISEF-C	(HELECTR-11)	OGILVIE				
MASS SPECTROMETER FOR 4.7 TO 10.000 EV PER CHARGE AND 1 TO 5.6 AMU PER CHARGE			R 4.700E-01 TO 1.050E 04 EV	H		64

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2.4 SENSING OTHER PARTICLE SPECIES						
ESRO GEGS (ESGPO -73) GEISS			R 1.000E 00 TO 1.730E 04 EV	F		35
LOW-ENERGY ION COMPOSITION.....						
PIONEER VENUS ORBITER (PI0780R-17) TAYLOR, JR.			R 1.000E 00 TO 6.000E 01 EV		2	110
ION MASS SPECTROMETER.....						
APOLLO 12 LM/ALSEP (69-090C-05) FREEMAN			P 1.000E 01 TO 3.000E 03 EV	GH		21
SUPRATHERMAL ION DETECTOR.....						
IMP-J (73-078A-10) SAME			P 1.000E 02 TO 2.500E 03 EV	GH		55
MEASUREMENT OF SOLAR PLASMA.....						
APOLLO 14 LM/ALSEP (71-008C-08) O'BRIEN			N 1.700E 02 TO 2.000E 03 EV	GH	M	22
CHARGED PARTICLE LUNAR ENVIRONMENT.....						
IMP-H (72-073A-10) SAME			P 2.000E 02 TO 2.000E 04 EV	GH		50
MEASUREMENT OF SOLAR PLASMA.....						
IMP-H (72-073A-12) OSILVIE			R 3.000E 02 TO 3.750E 03 EV	H		51
SOLAR WIND ION COMPOSITION.....						
IMP-I (71-019A-11) SAME			P 9.000E 02 TO 8.000E 03 EV	DEFGH		53
MEASUREMENT OF SOLAR PLASMA.....						
VELA 6A (70-027A-05) SAME			P 1.000E 03 TO 8.300E 03 EV	H		141
SOLAR WIND EXPERIMENT.....						
VELA 5A (69-046D-05) SAME			P 1.000E 03 TO 8.300E 03 EV	GH		139
SOLAR WIND EXPERIMENT.....						
APOLLO 14 LM/ALSEP (71-008C-03) O'BRIEN			N 2.000E 03 TO 2.000E 04 EV	GH	4	22
CHARGED PARTICLE LUNAR ENVIRONMENT.....						
ISCE-C (HELOCTR-03) HOVESTADT			R 5.000E 03 TO 5.000E 04 EV	H		64
LOW-ENERGY COSMIC-RAY COMPOSITION.....						
ISCE-A (MOTHR -05) HOVESTADT			R 5.000E 03 TO 5.000E 04 EV	GH		60
LOW-ENERGY COSMIC-RAY COMPOSITION.....						
MJS 77A (MARN77A-07) KRINIGIS			R 1.000E 04 TO 1.000E 05 EV	H 6	5	78
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....						
MJS 77D (MARN77D-07) KRINIGIS			R 1.000E 04 TO 1.000E 05 EV	H 6	5	81
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....						
ISCE-C (HELOCTR-03) HOVESTADT			R 5.000E 04 TO 5.000E 05 EV	H		64
LOW-ENERGY COSMIC-RAY COMPOSITION.....						
ISCE-A (MOTHR -05) HOVESTADT			R 5.000E 04 TO 5.000E 05 EV	GH		60
LOW-ENERGY COSMIC-RAY COMPOSITION.....						
IMP-H (72-073A-03) GLOECKLER			P 5.000E 04 TO 1.000E 06 EV	GH		51
IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV.....						
IMP-H (72-073A-13) CLINE			R 5.000E 04 TO 5.000E 05 EV	GH		51
STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS.....						
IMP-H (72-073A-03) GLOECKLER			P 5.000E 04 TO 1.000E 06 EV	GH		51
IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV.....						
IMP-J (73-078A-03) GLOECKLER			R 1.000E 05 TO 1.000E 06 EV	GH		56
SOLID-STATE DETECTORS.....						
HELIOS-A (HELID-A-08) TRAINOR			R 1.000E 05 TO 1.000E 06 EV	H		47
GALACTIC AND SOLAR COSMIC RAYS.....						
HELIOS-B (HELID-B-08) TRAINOR			R 1.000E 05 TO 1.000E 06 EV	H		49
GALACTIC AND SOLAR COSMIC RAYS.....						
MJS 77A (MARN77A-07) KRINIGIS			R 1.000E 05 TO 1.500E 08 EV	H 6	5	78
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....						
MJS 77Z (MARN77Z-07) KRINIGIS			R 1.000E 05 TO 1.500E 08 EV	H 6	5	81
LOW-ENERGY CHARGED PARTICLE ANALYZER AND TELESCOPE.....						
MJS 77B (MARN77B-08) VOGT			R 1.500E 05 TO 6.000E 06 EV	H 6	5	82
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....						
MJS 77A (MARN77A-08) VOGT			R 1.500E 05 TO 6.000E 06 EV	H 6	5	79
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....						
IMP-H (72-073A-03) GLOECKLER			R 4.000E 05 TO 2.000E 07 EV	GH		51
IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV.....						
IMP-H (72-073A-03) GLOECKLER			P 4.000E 05 TO 2.000E 07 EV	GH		51
IONS AND ELECTRONS IN THE ENERGY RANGE 0.1 TO 2 MEV.....						
IMP-H (72-073A-07) SIMPSON			R 5.000E 05 TO 5.000E 06 EV	GH		52
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT.....						
IMP-J (73-078A-07) SIMPSON			R 5.000E 05 TO 5.000E 06 EV			57
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS.....						
ISCE-C (HELOCTR-03) HOVESTADT			R 5.000E 05 TO 2.000E 06 EV	H		64
LOW-ENERGY COSMIC-RAY COMPOSITION.....						
ISCE-A (MOTHR -05) HOVESTADT			R 5.000E 05 TO 2.000E 06 EV	GH		60
LOW-ENERGY COSMIC-RAY COMPOSITION.....						
ISCE-C (HELOCTR-04) VON ROSENVING			R 5.000E 05 TO 5.000E 08 EV	H		65
SOLAR AND GALACTIC ENERGETIC PARTICLES.....						
IMP-H (72-073A-13) CLINE			R 5.000E 05 TO 2.000E 06 EV	GH		51
STUDY OF COSMIC-RAY, SOLAR, AND MAGNETOSPHERIC ELECTRONS.....						
SOLRAD 11A (SRD-11A-17) BLAKE			R 5.000E 05 TO INFINITY	GH		127
OMNIDIRECTIONAL PROTONS.....						
SOLRAD 11B (SRD-11B-17) BLAKE			R 5.000E 05 TO INFINITY	GH		131
OMNIDIRECTIONAL PROTONS.....						
IMP-H (72-073A-08) KRINIGIS			N 7.700E 05 TO 3.200E 06 EV	GH		51
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....						
IMP-H (72-073A-08) KRINIGIS			N 7.700E 05 TO 3.200E 06 EV	GH		51
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....						
TD 1A (72-014A-03) LABEYRIE			U 1.000E 06 TO INFINITY	CD		136
SPECTROMETRY OF PRIMARY CHARGED PARTICLES.....						
IMP-J (73-078A-03) GLOECKLER			R 1.000E 06 TO 2.000E 06 EV	GH		
SOLID-STATE DETECTORS.....						
HELIOS-A (HELID-A-08) TRAINOR			R 1.000E 06 TO 1.000E 07 EV	H		47
GALACTIC AND SOLAR COSMIC RAYS.....						

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2.4 SENSING OTHER PARTICLES SPECIES							
HEL105-B	(HEL10-B-08)	TRAINOR	R 1.000E 06 TO 1.000E 07 EV		H		49
GALACTIC AND SOLAR COSMIC RAYS.....							
ISEE-C	(HELOCTR-12)	STONE	R 2.000E 06 TO 2.000E 07 EV		H		65
COSMIC-RAY COMPOSITION.....							
ISEE-C	(HELOCTR-03)	HOVESTADT	R 2.000E 06 TO 2.000E 07 EV		H		64
LOW-ENERGY COSMIC-RAY COMPOSITION.....							
ISEE-A	(MOTHER -05)	HOVESTADT	R 2.000E 06 TO 2.000E 07 EV		GH		60
LOW-ENERGY COSMIC-RAY COMPOSITION.....							
SOLRAD 11A	(SRD-11A-14)	BLAKE	N 3.000E 06 TO INFINITY		GH		127
SOLAR PROTONS.....							
SOLRAD 11B	(SRD-11B-14)	BLAKE	N 3.000E 06 TO INFINITY		GH		130
SOLAR PROTONS.....							
SOLRAD 11A	(SRD-11A-23)	BLAKE	N 3.000E 06 TO INFINITY		GH		127
ANTI SOLAR PROTONS.....							
SOLRAD 11B	(SRD-11B-23)	BLAKE	N 3.000E 06 TO INFINITY		GH		131
ANTI SOLAR PROTONS.....							
PIONEER 10	(72-012A-12)	MCDONALD	R 3.000E 06 TO 3.000E 07 EV		H	5	103
COSMIC-RAY SPECTRA.....							
PIONEER 11	(73-019A-12)	MCDONALD	R 3.000E 06 TO 3.000E 07 EV		H	5	105
COSMIC-RAY SPECTRA.....							
IMP-H	(72-073A-08)	KRIMIGIS	N 3.300E 06 TO 7.600E 06 EV		GH		51
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....							
IMP-H	(72-073A-09)	MCDONALD	R 4.000E 06 TO 2.000E 07 EV		GH		51
SOLAR AND COSMIC-RAY PARTICLES.....							
IMP-J	(73-078A-09)	MCDONALD	R 4.000E 06 TO 2.000E 07 EV		GH		56
SOLAR AND COSMIC-RAY PARTICLES.....							
IMP-I	(71-019A-08)	MCDONALD	R 4.200E 06 TO 1.910E 07 EV		FGH		54
SOLAR AND GALACTIC COSMIC-RAY STUDIES.....							
IMP-H	(72-073A-17)	SIMPSON	R 5.000E 06 TO 5.000E 07 EV		GH		52
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z ISOTOPE EXPERIMENT.....							
IMP-J	(73-078A-07)	SIMPSON	R 5.000E 06 TO 5.000E 07 EV		GH		57
SOLAR FLARE HIGH-Z/LOW-E AND LOW-Z EXPERIMENTS.....							
IMP-H	(72-073A-05)	WILLIAMS	U 5.000E 06 TO INFINITY		GH		52
ENERGETIC ELECTRONS AND PROTONS.....							
IMP-J	(73-078A-05)	WILLIAMS	U 5.000E 06 TO INFINITY		GH		57
ENERGETIC ELECTRONS AND PROTONS.....							
MJS 77B	(MARN77B-08)	VOGT	R 6.000E 06 TO 3.000E 07 EV		H 6	5	82
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....							
PIONEER 10	(72-012A-02)	SIMPSON	R 6.000E 06 TO 6.000E 07 EV		H	5	103
CHARGED PARTICLE COMPOSITION.....							
PIONEER 11	(73-019A-02)	SIMPSON	R 6.000E 06 TO 6.000E 07 EV		H	5	106
CHARGED PARTICLE COMPOSITION.....							
MJS 77A	(MARN77A-08)	VOGT	R 6.000E 06 TO 3.000E 07 EV		H 6	5	79
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....							
IMP-J	(73-078A-08)	KRIMIGIS	N 8.000E 06 TO INFINITY		GH		56
CHARGED PARTICLE MEASUREMENTS EXPERIMENT.....							
ISEE-C	(HELOCTR-05)	HECKMAN	R 1.000E 07 TO 1.000E 08 EV		H		64
HIGH-ENERGY COSMIC RAYS.....							
IMP-I	(71-019A-09)	SIMPSON	R 1.000E 07 TO 1.000E 08 EV		GH		55
NUCLEAR COMPOUND COSMIC AND SOLAR PARTICLE RADIATION.....							
HEL105-B	(HEL10-B-08)	TRAINOR	R 1.000E 07 TO 8.000E 08 EV		H		49
GALACTIC AND SOLAR COSMIC RAYS.....							
HEL105-A	(HEL10-A-08)	TRAINOR	R 1.000E 07 TO 8.000E 08 EV		H		47
GALACTIC AND SOLAR COSMIC RAYS.....							
ISEE-A	(MOTHER -14)	SIMPSON	R 1.000E 07 TO 1.000E 08 EV		GH		61
MEDIUM-ENERGY COSMIC RAYS.....							
IMP-I	(71-019A-08)	MCDONALD	R 1.870E 07 TO 8.160E 07 EV		FGH		54
SOLAR AND GALACTIC COSMIC-RAY STUDIES.....							
ISEE-C	(HELOCTR-12)	STONE	R 2.000E 07 TO 2.000E 08 EV		H		65
COSMIC-RAY COMPOSITION.....							
PIONEER 10	(72-012A-12)	MCDONALD	R 2.000E 07 TO 2.300E 08 EV		H	5	103
COSMIC-RAY SPECTRA.....							
PIONEER 11	(73-019A-12)	MCDONALD	R 2.000E 07 TO 2.000E 08 EV		H	5	105
COSMIC-RAY SPECTRA.....							
IMP-H	(72-073A-09)	MCDONALD	R 2.000E 07 TO 8.000E 07 EV		GH		51
SOLAR AND COSMIC-RAY PARTICLES.....							
IMP-J	(73-078A-09)	MCDONALD	R 2.000E 07 TO 8.000E 07 EV		GH		56
SOLAR AND COSMIC-RAY PARTICLES.....							
MJS 77B	(MARN77B-09)	VOGT	R 3.000E 07 TO 5.000E 08 EV		H 6	5	82
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....							
MJS 77A	(MARN77A-09)	VOGT	R 3.000E 07 TO 5.000E 08 EV		H 6	5	79
HIGH- AND MODERATELY LOW-ENERGY COSMIC-RAY TELESCOPE.....							
PIONEER 9	(68-100A-06)	WEBER	R 4.200E 07 TO 3.200E 08 EV		H		101
COSMIC-RAY TELESCOPE.....							
PIONEER 10	(72-012A-02)	SIMPSON	R 6.000E 07 TO 1.500E 08 EV		H	5	103
CHARGED PARTICLE COMPOSITION.....							
PIONEER 11	(73-019A-02)	SIMPSON	R 6.000E 07 TO 1.500E 08 EV		H	5	106
CHARGED PARTICLE COMPOSITION.....							
ISEE-C	(HELOCTR-06)	MEYER	R 6.000E 07 TO 6.000E 08 EV		H		64
COSMIC-RAY ELECTRONS AND NUCLEI.....							
PIONEER 8	(67-123A-06)	WEBER	R 6.300E 07 TO 1.700E 08 EV		H		99
COSMIC-RAY GRADIENT DETECTOR.....							
IMP-I	(71-019A-08)	MCDONALD	R 8.000E 07 TO 5.000E 08 EV		FGH		54
SOLAR AND GALACTIC COSMIC-RAY STUDIES.....							
IMP-H	(72-073A-09)	MCDONALD	R 8.000E 07 TO 5.000E 08 EV		GH		51
SOLAR AND COSMIC-RAY PARTICLES.....							
IMP-J	(73-078A-09)	MCDONALD	R 8.000E 07 TO 5.000E 08 EV		GH		56
SOLAR AND COSMIC-RAY PARTICLES.....							
ISEE-A	(MOTHER -14)	SIMPSON	R 1.000E 08 TO 7.000E 08 EV		GH		41
MEDIUM-ENERGY COSMIC RAYS.....							

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2.4 SENSING OTHER PARTICLE SPECIES

PIONEER 8	(67-123A-06)	WEBER			
COSMIC-RAY GRADIENT DETECTOR.....			R 1.700E 08 TO 1.600E 09 EV	H	99
HEAD-C	(HEAD-C -03)	ISRAEL			
HEAVY NUCLEII EXPERIMENT.....			R 3.000E 08 TO 1.000E 09 EV	B	45
PIONEER 9	(68-100A-06)	WEBER			
COSMIC-RAY TELESCOPE.....			R 3.200E 08 TO 2.200E 09 EV	H	101
ISEE-C	(HELOCTR-06)	MEYER			
COSMIC-RAY ELECTRONS AND NUCLEII.....			R 6.000E 08 TO 6.000E 09 EV	H	64
HEAD-C	(HEAD-C -03)	ISRAEL			
HEAVY NUCLEII EXPERIMENT.....			R 1.000E 09 TO 1.000E 10 EV	B	45
HEAD-C	(HEAD-C -04)	KOCH			
ISOTOPIC COMPOSITION OF COSMIC RAYS.....			R 2.000E 09 TO 2.500E 10 EV	B	45
ISEE-C	(HELOCTR-06)	MEYER			
COSMIC-RAY ELECTRONS AND NUCLEII.....			R 6.000E 09 TO 1.300E 10 EV	H	64
ISEE-C	(HELOCTR-06)	MEYER			
COSMIC-RAY ELECTRONS AND NUCLEII.....			R 1.300E 10 TO INFINITY	H	64

SATELLITE NAME	EXPERIMENT ID	EXPERIMENTER	TECHNIQUE	REGION	PLANET
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3. MICROSCOPIC NEUTRAL MEASUREMENTS

3.1 SENSING NEUTRONS

VELA 5A	(69-046D-07)	NAME			
NEUTRON DETECTOR.....			OTHER (NOT EM TECHNIQUE)	GH	134
VELA 5B	(69-046E-07)	NAME			
NEUTRON DETECTOR.....			OTHER (NOT EM TECHNIQUE)	GH	140
VELA 6A	(70-027A-07)	NAME			
NEUTRON DETECTOR.....			OTHER (NOT EM TECHNIQUE)	GH	141
VELA 6B	(70-027B-07)	NAME			
NEUTRON DETECTOR.....			OTHER (NOT EM TECHNIQUE)	GH	142
INDIAN SCIENTIFIC SAT. (INDASAT-02)	DANIEL				
SOLAR NEUTRON AND GAMMA RAYS.....			OTHER (NOT EM TECHNIQUE)	H	57

3.2 SENSING INDIVIDUAL ATOMS AND/OR MOLECULES

APOLLO 14 LM/ALSEP	(71-008F-07)	JOHNSON			
COLD CATHODE ION GAUGE EXPERIMENT.....				M	22
APOLLO 15 LM/ALSEP	(71-063C-07)	JOHNSON			
COLD CATHODE ION GAUGE EXPERIMENT.....				M	23
VIKING-B LANDER	(VIKG-BL-04)	BIEMANN			
MOLECULAR ANALYSIS.....				A	146
PIONEER VENUS PROBE LRG (PI070PB-05)	GEISE				
INFRARED RADIOMETER.....				2	112
VIKING-A LANDER	(VIKG-AL-02)	NIER			
ENTRY-ATMOSPHERIC STRUCTURE.....				6	144
VIKING-A LANDER	(VIKG-AL-07)	NESS			
METEOROLOGY EXPERIMENT.....				4	143
VIKING-B LANDER	(VIKG-BL-02)	NIER			
ENTRY-ATMOSPHERIC STRUCTURE.....				4	147
VIKING-B LANDER	(VIKG-BL-07)	NESS			
METEOROLOGY EXPERIMENT.....				A	146
PIONEER VENUS PROBE LRG (PI070PB-01)	SEIFF				
ATMOSPHERE STRUCTURE.....				2	113
VIKING-B LANDER	(VIKG-BL-02)	NIER			
ENTRY-ATMOSPHERIC STRUCTURE.....				4	147
PIONEER VENUS PROBE LRG (PI070PB-01)	SEIFF				
ATMOSPHERE STRUCTURE.....				2	113
A-C	(73-101A-05)	HEATH			
SOLAR EUV FILTER PHOTOMETER.....			X MASS SPECTROMETRY	B	9
AE-C	(73-101A-07)	NIFR			
OPEN SOURCE NEUTRAL MASS SPECTROMETER.....			X MASS SPECTROMETRY	BC	10
AE-C	(73-101A-09)	SPENCER			
NEUTRAL GAS TEMPERATURE AND CONCENTRATION.....			X MASS SPECTROMETRY	BC	11
AE-C	(73-101A-16)	RICE			
CAPACITANCE MANOMETER.....			X MASS SPECTROMETRY	B	15
SAN MARCO 4	(74-009A-02)	NEWTON			
NEUTRAL ATMOSPHERE COMPOSITION.....			X MASS SPECTROMETRY	B	118
SAN MARCO 4	(74-009A-03)	SPENCER			
NEUTRAL ATMOSPHERE TEMPERATURE.....			X MASS SPECTROMETRY	B	110
QEROS 2	(74-055A-05)	SPENCER			
NEUTRAL ATMOSPHERE TEMPERATURE EXPERIMENT.....			X MASS SPECTROMETRY	BC	18
AE-D	(AE-D -07)	NIER			
OPEN SOURCE NEUTRAL MASS SPECTROMETER.....			X MASS SPECTROMETRY	BC	13
AE-D	(AE-D -08)	PELZ			
CLOSED SOURCE NEUTRAL MASS SPECTROMETER.....			X MASS SPECTROMETRY	BC	13
AE-D	(AE-D -09)	SPENCER			
NEUTRAL GAS TEMPERATURE AND CONCENTRATION.....			X MASS SPECTROMETRY	BC	14
AE-E	(AE-E -07)	NIER			
OPEN SOURCE NEUTRAL MASS SPECTROMETER.....			X MASS SPECTROMETRY	B	16
AE-E	(AE-E -08)	PELZ			
CLOSED SOURCE NEUTRAL MASS SPECTROMETER.....			X MASS SPECTROMETRY	H	17
AE-E	(AE-E -09)	SPENCER			
NEUTRAL GAS TEMPERATURE AND CONCENTRATION.....			X MASS SPECTROMETRY	J	17
DADE-A	(DADE-A -02)	NIER			

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3.2 SENSING INDIVIDUAL ATOMS AND/OR MOLECULES

ATMOSPHERIC COMPOSITION MASS SPECTROMETER.....	X MASS SPECTROMETRY	C		31
DADE-B (DADE-B -02) NIER				
ATMOSPHERIC COMPOSITION MASS SPECTROMETER.....	X MASS SPECTROMETRY	C		32
PIONEER VENUS ORBITER (PI07BOR-17) TAYLOR, JR.	X MASS SPECTROMETRY		2	110
ION MASS SPECTROMETER.....	X MASS SPECTROMETRY		2	111
PIONEER VENUS PROBE BUS (PI07BPA-03) VON ZAHN	X MASS SPECTROMETRY		2	112
NEUTRAL PARTICLE MASS SPECTROMETER.....	X MASS SPECTROMETRY			117
PIONEER VENUS PROBE LRG (PI07BPA-06) HOFFMAN	X MASS SPECTROMETRY			143
NEUTRAL PARTICLE MASS SPECTROMETER.....	X MASS SPECTROMETRY	C		117
SJ-2 (ST73-6A-02) PHILBRICK	X MASS SPECTROMETRY			143
VELOCITY MASS SPECTROMETER.....	X MASS SPECTROMETRY			143
VIKING-A LANDER (VIK-AL-04) RIEMANN	X MASS SPECTROMETRY			143
MOLECULAR ANALYSIS.....	X MASS SPECTROMETRY	B		143
SAN MARCO 4 (74-009A-03) SPENCER	X MASS SPECTROMETRY	BC		143
NEUTRAL ATMOSPHERIC TEMPERATURE.....	X MASS SPECTROMETRY			143
AEROS 2 (74-055A-01) KRANKOWSKY	X MASS SPECTROMETRY			143
MASS SPECTROMETER (MS).....	X MASS SPECTROMETRY		2	109
PIONEER VENUS ORBITER (PI07BOR-11) NIEMANN	X MASS SPECTROMETRY			147
NEUTRAL PARTICLE MASS SPECTROMETER.....	X MASS SPECTROMETRY			147
VIKING-B LANDER (VIK-BL-01) SHORTHILL	X MASS SPECTROMETRY			147
PHYSICAL PROPERTIES INVESTIGATION.....	X MASS SPECTROMETRY			147
VIKING-B LANDER (VIK-BL-12) NIER	X MASS SPECTROMETRY			147
ENTRY-ATMOSPHERIC COMPOSITION.....	X OTHER EM TECHNIQUE			144
VIKING-A LANDER (VIK-AL-01) SHORTHILL	X OTHER EM TECHNIQUE			144
PHYSICAL PROPERTIES INVESTIGATION.....	X OTHER EM TECHNIQUE			144
VIKING-A LANDER (VIK-AL-12) NIER	X OTHER EM TECHNIQUE			144
ENTRY-ATMOSPHERIC COMPOSITION.....	X OTHER (NOT EM TECHNIQUE)		2	112
PIONEER VENUS PROBE LRG (PI07BPA-04) NYAHA				
GAS CHROMATOGRAPH.....	TOTAL DENSITY SENSOR	D		10
AE-C (73-101A-15) RICE	TOTAL DENSITY SENSOR		6	75
COLD CATHODE ION GAUGE.....	TOTAL DENSITY SENSOR		6	80
MJS 77A (MARN77A-02) ESHLEMAN				
RADIO SCIENCE TEAM.....				
MJS 77B (MARN77B-02) ESHLEMAN				
RADIO SCIENCE TEAM.....				

3.3 SENSING ATOMS AND/OR MOLECULES COLLECTIVELY

AD-A (63-053A-01) O'SULLIVAN, JR.	X DRAG DENSITY	C		7
SATELLITE DRAG ATMOSPHERIC DENSITY.....	X DRAG DENSITY	C		7
AD-C (68-06AA-01) KEATING	X DRAG DENSITY			
SATELLITE DRAG ATMOSPHERIC DENSITY.....	X DRAG DENSITY	C		18
AEROS 2 (74-055A-06) ROEMER	X DRAG DENSITY			15
ATMOSPHERIC DRAG ANALYSIS.....	X DRAG DENSITY	B		31
AE-E (AE-E -02) CHAMPION	X DRAG DENSITY			31
ATMOSPHERIC DRAG.....	X DRAG DENSITY	C		31
DADE-A (DADE-A -01) KEATING	X DRAG DENSITY			
ATMOSPHERIC DRAG DENSITY.....	X DRAG DENSITY	C		31
DADE-B (DADE-B -01) KEATING	X DRAG DENSITY			
ATMOSPHERIC DRAG DENSITY.....	X DRAG DENSITY			
ESSA 8 (68-11AA-01) NESS STAFF	O IMAGERY	A	1	36
AUTOMATIC PICTURE TRANSMISSION (APT) SYSTEM.....	O IMAGERY	A	3	37
LRTS 1 (72-058A-02) APLUSKAS	O IMAGERY	A	3	90
MULTISPECTRAL SCANNER (MSS).....	O IMAGERY			
NOAA 2 (72-082A-02) NESS STAFF	O IMAGERY			
SCANNING RADIOMETER (SR).....	X IMAGERY	A	3	84
NIMBUS 4 (72-097A-04) WILHEIT, JR.	X IMAGERY	A	3	84
ELECTRICALLY SCANNING MICROWAVE RADIOMETER (ESMR).....	X IMAGERY	A	3	84
NIMBUS 5 (72-097A-08) MCCULLOCH	X IMAGERY	A	12	76
TEMPERATURE/HUMIDITY INFRARED RADIOMETER (THIR).....	X IMAGERY			
MARINER 10 (73-082A-06) CHASE, JR.	O IMAGERY	A	3	90
TWO-CHANNEL IR RADIOMETER.....	O IMAGERY	A	3	91
NOAA 3 (73-086A-02) NESS STAFF	O IMAGERY	A	3	123
SCANNING RADIOMETER (SR).....	O IMAGERY	A	3	34
NOAA 4 (73-086A-03) NESS STAFF	O IMAGERY	A	3	34
VERY HIGH RESOLUTION RADIOMETER (VHRR).....	O IMAGERY	A	3	39
SMS-A (74-033A-01) NESS STAFF	O IMAGERY	A	3	40
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISR).....	O IMAGERY	A	3	91
LRTS-3 (ERTS-B -01) WEINSTEIN	O IMAGERY	A	3	72
RETURN BEAM VIDICON (RBV) CAMERA SYSTEM.....	O IMAGERY			
ERTS-B (ERTS-B -02) ARLUSKAS	O IMAGERY			
MULTISPECTRAL SCANNER (MSS).....	O IMAGERY			
GOES-B (GOPS-B -01) NESS STAFF	O IMAGERY	A	3	39
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISR).....	O IMAGERY	A	3	40
GOES-C (GOPS-C -01) NESS STAFF	O IMAGERY	A	3	91
VISIBLE-INFRARED SPIN-SCAN RADIOMETER (VISR).....	O IMAGERY	A	3	91
NOAA 4 (ITOS-G -02) NESS STAFF	O IMAGERY	A	3	91
SCANNING RADIOMETER (SR).....	O IMAGERY	A	3	91
NOAA 4 (ITOS-G -03) NESS STAFF	O IMAGERY	A	3	91
VERY HIGH RESOLUTION RADIOMETER (VHRR).....	O IMAGERY	A	3	91
ITOS-1 (ITOS-I -01) NESS STAFF	O IMAGERY	A	3	91
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....	O IMAGERY	A	3	91
ITOS-J (ITOS-J -01) NESS STAFF	O IMAGERY	A	3	91
ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR).....	O IMAGERY	A	3	91

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3.3 SENSING ATOMS AND/OR MOLECULES COLLECTIVELY						
RADIOMETER (AVHRR).....			D IMAGERY	A	3	71
NIMBUS-F (NIMBS-F-03) WILHEIT, JR.						
ELECTRICALLY SCANNING MICROWAVE			X IMAGERY	A	3	87
RADIOMETER (ESMR).....						
NIMBUS-F (NIMBS-F-05) SMITH			X IMAGERY	A	1	86
EARTH RADIATION BUDGET (ERB).....						
NIMBUS-F (NIMBS-F-09) HOUGHTON			X IMAGERY	A	3	85
PRESSURE-MODULATED RADIOMETER (PMR).....						
NIMBUS-F (NIMBS-F-10) STAELIN			X IMAGERY	A	1	86
SCANNING MICROWAVE SPECTROMETER (SCAMS).....						
NIMBUS-F (NIMBS-F-12) DANDEFN						
TEMPERATURE/HUMIDITY INFRARED RADIOMETER						
(THIR).....			X IMAGERY	A	3	85
NIMBUS-G (NIMBS-G-03) HOVIS						
COASTAL ZONE OCEAN COLOR SCANNER.....			X IMAGERY	A	3	88
NIMBUS-G (NIMBS-G-07) JACOBOWITZ						
EARTH RADIATION BUDGET (ERB).....			X IMAGERY	A	3	88
NIMBUS-G (NIMBS-G-24) GLOERSEN						
SCANNING (MULTISPECTRAL) MICROWAVE						
RADIOMETER (SMHR).....			X IMAGERY	A	3	88
PIONEER VENUS ORBITER (PI078OR-06) HANSEN						
CLOUD POLARIMETER.....			X IMAGERY		2	108
PIONEER VENUS PROBE LPG (PI078PB-02) RAGENT						
CLOUD EXTENT, STRUCTURE, AND						
DISTRIBUTION.....			X IMAGERY		2	113
PIONEER VENUS PROBE LRG (PI078PB-05) ROESE						
INFRARED RADIOMETER.....			X IMAGERY		2	112
PIONEER VENUS PROBE SM1 (PI078PC-02) RAGENT						
CLOUD EXTENT, STRUCTURE, AND						
DISTRIBUTION.....			X IMAGERY		2	113
PIONEER VENUS PROBE SM2 (PI078PD-02) RAGENT						
CLOUD EXTENT, STRUCTURE, AND						
DISTRIBUTION.....			X IMAGERY		2	114
PIONEER VENUS PROBE SM3 (PI078PE-02) RAGENT						
CLOUD EXTENT, STRUCTURE, AND						
DISTRIBUTION.....			X IMAGERY		2	115
SM5-B (SM5-B -04) NESS STAFF						
VISIBLE-INFRARED SPIN-SCAN RADIOMETER						
(VISSR).....			D IMAGERY	A	3	124
SM5-C (SM5-C -01) NESS STAFF						
VISIBLE-INFRARED SPIN-SCAN RADIOMETER						
(VISSR).....			D IMAGERY	A	3	125
TIROS-N (TIROS-N-01) NESS STAFF						
ADVANCED VERY HIGH RESOLUTION						
RADIOMETER (AVHRR).....			X IMAGERY	A	3	137
AE-D (AE-D -14) RICE						
CAPACITANCE MANOMETER.....			X MASS SPECTROMETRY	C		14
AE-D (AE-D -15) RICE						
COLD CATHODE ION GAUGE.....			X MASS SPECTROMETRY	C		14
AE-E (AE-E -12) RICE						
CAPACITANCE MANOMETER.....			X MASS SPECTROMETRY	B		17
AE-E (AE-E -13) RICE						
COLD CATHODE ION GAUGE.....			X MASS SPECTROMETRY	B		17
NIMBUS 4 (70-025A-35) NFATH						
BACKSCATTER ULTRAVIOLET (BUV)						
SPECTROMETER.....			X OTHER EM TECHNIQUE	A	3	83
IS15 2 (71-024A-11) ANGER						
3914- TO 5977-A PHOTOMETER.....			X OTHER EM TECHNIQUE	BC		60
IS15 2 (71-024A-12) SHEPHERD						
6300-A PHOTOMETER.....			X OTHER EM TECHNIQUE	BC		69
NIMBUS 5 (72-097A-01) SMITH						
INFRARED TEMPERATURE PROFILE RADIOMETER						
(ITPR).....			X OTHER EM TECHNIQUE	A	3	84
NIMBUS 5 (72-097A-02) HOUGHTON						
SELECTIVE CHOPPER RADIOMETER (SCR).....			X OTHER EM TECHNIQUE	A	3	83
NIMBUS 5 (72-097A-03) STAELIN						
NIMBUS 5 MICROWAVE SPECTROMETER (NEMS).....			X OTHER EM TECHNIQUE	A	3	84
MARINER 10 (73-085A-05) BROADFOOT						
EUV SPECTROSCOPY.....			X OTHER EM TECHNIQUE	A	I 123	76
AE-C (73-101A-13) BARTH						
ULTRAVIOLET NITRIC-OXIDE EXPERIMENT.....			X OTHER EM TECHNIQUE	BC		8
AE-C (73-101A-14) HAYS						
AIRGLOW PHOTOMETER.....			X OTHER EM TECHNIQUE	DC		9
AE-D (AE-D -11) BARTH						
ULTRAVIOLET NITRIC-OXIDE EXPERIMENT.....			X OTHER EM TECHNIQUE	DC		11
AE-D (AE-D -13) HAYS						
AIRGLOW PHOTOMETER.....			X OTHER EM TECHNIQUE	RC		12
AE-E (AE-E -11) HAYS						
AIRGLOW PHOTOMETER.....			X OTHER EM TECHNIQUE	R		16
ASTP (ASTP -03) DONAHUE						
ULTRAVIOLET ATMOSPHERIC ABSORPTION.....			X OTHER EM TECHNIQUE	R		26
INDIAN SCIENTIFIC SAT. (INDASAT-03) SATYAPRAKASH						
IONOSPHERIC ELECTRON TRAP AND UV						
CHAMBERS.....			X OTHER EM TECHNIQUE	R		57
NOAA 4 (IT05-G -04) NESS STAFF						
VERTICAL TEMPERATURE PROFILE RADIOMETER						
(VTPR).....			D OTHER EM TECHNIQUE	A	3	92
IT05-H (IT05-H -01) NESS STAFF						
ADVANCED VERY HIGH RESOLUTION						
RADIOMETER (AVHRR).....			D OTHER EM TECHNIQUE	A	3	71
IT05-H (IT05-H -02) NESS STAFF						
TIROS OPERATIONAL VERTICAL SOUNDER						
(TOVS).....			D OTHER EM TECHNIQUE	A	3	71
IT05-I (IT05-I -02) NESS STAFF						
TIROS OPERATIONAL VERTICAL SOUNDER						
(TOVS).....			D OTHER EM TECHNIQUE	A	3	72
IT05-J (IT05-J -02) NESS STAFF						
TIROS OPERATIONAL VERTICAL SOUNDER						
(TOVS).....			D OTHER EM TECHNIQUE	A	3	73

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J.3 SENSING ATOMS AND/OR MOLECULES COLLECTIVELY										
MJS 77A	(MARN77A-03)	HANEL			OTHER EM TECHNIQUE			6	5	78
INFRARED SPECTROSCOPY AND RADIOMETRY.....										
MJS 77A	(MARN77A-04)	BROADFOOT			X OTHER EM TECHNIQUE			6	5	78
ULTRAVIOLET SPECTROSCOPY.....										
MJS 77D	(MARN77D-03)	HANEL			X OTHER EM TECHNIQUE			6	5	80
INFRARED SPECTROSCOPY AND RADIOMETRY.....										
MJS 77D	(MARN77D-04)	BROADFOOT			X OTHER EM TECHNIQUE			6	5	80
ULTRAVIOLET SPECTROSCOPY.....										
NIMBUS-F	(NIMBS-F-02)	MCCULLOCH								
HIGH RESOLUTION INFRARED RADIATION										
SOUNDER (HIRS).....			X OTHER EM TECHNIQUE	A				3		86
NIMBUS-F	(NIMBS-F-04)	GILLE								
LIMB RADIANCE INVERSION RADIOMETER										
(LIRIR).....			X OTHER EM TECHNIQUE	A				3		85
NIMBUS-G	(NIMBS-G-01)	RUSSELL, JR								
LOWER ATMOSPHERIC COMPOSITION AND										
TEMPERATURE EXPERIMENT (LACATE).....			X OTHER EM TECHNIQUE	A				3		89
NIMBUS-G	(NIMBS-G-02)	HOUGHTON								
STRATOSPHERIC AND MESOSPHERIC SOUNDER										
(SAMS).....			X OTHER EM TECHNIQUE	A				3		88
NIMBUS-G	(NIMBS-G-06)	FRASER								
STRATOSPHERIC AEROSOL MEASUREMENT-11										
(SAM-11).....			X OTHER EM TECHNIQUE	A				3		87
NIMBUS-G	(NIMBS-G-09)	HEATH								
SOLAR AND BACKSCATTER ULTRAVIOLET/TOTAL										
OZONE MAPPING SYSTEM (SBUV/TOMS).....			X OTHER EM TECHNIQUE							88
PIONEER VENUS ORBITER	(PI078OR-16)	TAYLOR								
RADIO-METRIC TEMPERATURE SOUNDING										
EXPERIMENT.....			X OTHER EM TECHNIQUE					2		109
SRATS	(SRATS -03)	TOMIATSU								
GEOCORONAL UV GLOW AND EARTH UV ALBEDO.....			X OTHER EM TECHNIQUE	B						135
TIROS-N	(TIROS-N-02)	NESS STAFF								
TIROS OPERATIONAL VERTICAL SOUNDER										
(TOVS).....			X OTHER EM TECHNIQUE	A				3		137
OSD 5	(69-006A-07)	NEY								
ZODIACAL LIGHT MONITOR.....			X OTHER EM TECHNIQUE	B						93
PIONEER VENUS ORBITER	(PI078OR-03)	CHOFT								
RADIO SCIENCE TEAM.....			OTHER EM TECHNIQUE					2		107
PIONEER VENUS ORBITER	(PI078OR-15)	STEWART								
PROGRAMMABLE ULTRAVIOLET SPECTROMETER.....			X OTHER EM TECHNIQUE					2		109
PIONEER VENUS PROBE BUS	(PI078PA-07)	PETTENGILL								
RADIO SCIENCE TEAM.....			X OTHER EM TECHNIQUE							111
MJS 77A	(MARN77A-11)	LILLIE								
MULTIFILTER PHOTOPOLARIMETER,										
2200-7300 A.....			X OTHER EM TECHNIQUE					6	5	78
MJS 77B	(MARN77B-11)	LILLIE								
MULTIFILTER PHOTOPOLARIMETER,										
2200-7300 A.....			X OTHER EM TECHNIQUE					6	5	81
NIMBUS-G	(NIMBS-G-05)	REICHEL, JR.								
MEASUREMENT OF AIR POLLUTION FROM										
SATELLITE (MAPS).....			X OTHER (NOT EM TECHNIQUE)							89
PIONEER VENUS PROBE BUS	(PI078PA-06)	PETTENGILL								
DIFFERENTIAL VERY-LONG-BASELINE										
INTERFEROMETRIC TRACKING.....			X OTHER (NOT EM TECHNIQUE)					2		111
PIONEER VENUS PROBE LRG	(PI078PB-09)	PETTENGILL								
DIFFERENTIAL VERY-LONG-BASELINE										
INTERFEROMETRIC TRACKING.....			X OTHER (NOT EM TECHNIQUE)					2		112
PIONEER VENUS PROBE SM1	(PI078PC-03)	PETTENGILL								
DIFFERENTIAL VERY-LONG-BASELINE										
INTERFEROMETRIC TRACKING.....			X OTHER (NOT EM TECHNIQUE)					2		113
PIONEER VENUS PROBE SM2	(PI078PD-03)	PETTENGILL								
DIFFERENTIAL VERY-LONG-BASELINE										
INTERFEROMETRIC TRACKING.....			X OTHER (NOT EM TECHNIQUE)					2		114
PIONEER VENUS PROBE SM3	(PI078PE-03)	PETTENGILL								
DIFFERENTIAL VERY-LONG-BASELINE										
INTERFEROMETRIC TRACKING.....			X OTHER (NOT EM TECHNIQUE)					2		115
VIKING-A LANDER	(VIKG-AL-02)	NIER								
ENTRY-ATMOSPHERIC STRUCTURE.....			X OTHER (NOT EM TECHNIQUE)					4		144
VIKING-A LANDER	(VIKG-AL-07)	HESS								
METEOROLOGY EXPERIMENT.....			X OTHER (NOT EM TECHNIQUE)					4		143
VIKING-B LANDER	(VIKG-BL-02)	NIER								
ENTRY-ATMOSPHERIC STRUCTURE.....			X OTHER (NOT EM TECHNIQUE)					4		147
VIKING-B LANDER	(VIKG-BL-07)	HESS								
METEOROLOGY EXPERIMENT.....			X OTHER (NOT EM TECHNIQUE)					4		146
PIONEER VENUS PROBE LRG	(PI078PB-01)	SEIFF								
ATMOSPHERE STRUCTURE.....			X OTHER (NOT EM TECHNIQUE)					2		113
PIONEER VENUS PROBE SM1	(PI078PC-01)	SEIFF								
ATMOSPHERE STRUCTURE.....			X OTHER (NOT EM TECHNIQUE)					2		113
PIONEER VENUS PROBE SM2	(PI078PD-01)	SEIFF								
ATMOSPHERE STRUCTURE.....			X OTHER (NOT EM TECHNIQUE)					2		114
PIONEER VENUS PROBE SM3	(PI078PE-01)	SEIFF								
ATMOSPHERE STRUCTURE.....			X OTHER (NOT EM TECHNIQUE)					2		115
AE-C	(73-101A-02)	CHAMPION								
ATMOSPHERIC D-PA.....			X TOTAL DENSITY SENSOR	B						8
AE-D	(AF-D -02)	CHAMPION								
ATMOSPHERIC D-PA.....			X TOTAL DENSITY SENSOR	B						12
PIONEER VENUS PROBE LRG	(PI078PB-01)	SEIFF								
ATMOSPHERE STRUCTURE.....			X TOTAL DENSITY SENSOR					2		111
PIONEER VENUS PROBE SM1	(PI078PC-01)	SEIFF								
ATMOSPHERE STRUCTURE.....			X TOTAL DENSITY SENSOR					2		113
PIONEER VENUS PROBE SM2	(PI078PD-01)	SEIFF								
ATMOSPHERE STRUCTURE.....			X TOTAL DENSITY SENSOR					2		114
PIONEER VENUS PROBE SM3	(PI078PE-01)	SEIFF								
ATMOSPHERE STRUCTURE.....			X TOTAL DENSITY SENSOR					2		115
SESP 73-5	(ST73-5A-01)	MARCOS								
ACCELEROMETER DENSITY OBSERVATIONS.....			X TOTAL DENSITY SENSOR	C						120
SESP 73-5	(ST73-5A-02)	MARCOS								
IDN DENSITY GAUGES.....			X TOTAL DENSITY SENSOR	C						120

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3.3 SENSING ATOMS AND/OR MOLECULES COLLECTIVELY								
53-2	(5773-6A-01)	UNKNOWN						
NEUTRAL DENSITY EXPERIMENTS (COLD AND HOT CATHODE GAUGES).....					X TOTAL DENSITY SENSOR	C		117
53-2	(5773-6A-03)	CARTER						
NEUTRAL DENSITY EXPERIMENT (COLD CATHODE GAUGE).....					X TOTAL DENSITY SENSOR	C		116
53-2	(5773-6A-10)	MCISAAC						
TRIAXIAL PIEZOELECTRIC ACCELEROMETER.....					X TOTAL DENSITY SENSOR	C		117
4. OBSERVATIONS OF MACROSCOPIC BODIES								
4.1 SENSING MERCURY								
MARINER 10	(73-085A-01)	MURRAY						
TELEVISION PHOTOGRAPHY.....					IMAGERY		1	76
MARINER 10	(73-085A-02)	HOWARD						
S- AND X-BAND RADIO PROPAGATION.....					ORBIT ANALYSIS		12	76
4.2 SENSING VENUS								
PIONEER VENUS ORBITER	(P10780R-03)	CROFT						
RADIO SCIENCE TEAM.....					ELECTROMAGNETIC SIGNAL ANALYSIS		2	107
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4. SPACECRAFT AND EXPERIMENTS LAUNCHED OR INACTIVATED BETWEEN OCTOBER 1, 1973, AND SEPTEMBER 30, 1974

This section contains three listings of pertinent information concerning (1) launched spacecraft, (2) spacecraft and experiments placed in an "operational off" mode, and (3) spacecraft and experiments that became "inoperable."

4.1 SPACECRAFT LAUNCHED

The following table of spacecraft successfully launched between October 1, 1973, and September 30, 1974, inclusive, consists of both active spacecraft and other spacecraft for which little is known beyond the fact that they have been launched and have the initial orbit parameters indicated. This second group is included to inform the scientific community of the spacecraft launching; it is anticipated that such information may be relevant to studies performed by the users of this document. Some information concerning these lesser known spacecraft is available through the *SPACEWARN Bulletin* (described in the Introduction).

This table is ordered chronologically by the spacecraft launch date. The spacecraft common name, NSSDC ID code, spacecraft funding country/countries, orbit type, and spacecraft orbit parameters (epoch date, apoapsis, periapsis, inclination, and period) are also included for each spacecraft entry listed in the table. The distance and time parameters are shown in km altitude and minutes except for heliocentric-type orbits, which are shown in AU radial and days.

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SPACECRAFT LAUNCHED								
WSEDC ID	FUNDING COUNTRY	LAUNCH DATE	EPOCH DATE	ORBIT TYPE	APOAPSIS	PERIAPSIS	INCLINATION	PERIOD
73-069A	U.S.S.R.	10/02/73	10/03/73	GEOCENTRIC	312.0	204.0	72.8	89.7
73-069B	U.S.S.R.	10/02/73	10/03/73	GEOCENTRIC	312.0	204.0	72.8	89.7
73-069C	U.S.S.R.	10/02/73	10/03/73	GEOCENTRIC	312.0	204.0	72.8	89.7
73-069D	U.S.S.R.	10/02/73	10/03/73	GEOCENTRIC	312.0	204.0	72.8	89.7
73-069E	U.S.S.S.R.	10/02/73	10/03/73	GEOCENTRIC	312.0	204.0	72.8	89.7
73-069F	U.S.S.S.R.	10/02/73	10/03/73	GEOCENTRIC	312.0	204.0	72.8	89.7
73-069G	U.S.S.S.R.	10/02/73	10/03/73	GEOCENTRIC	312.0	204.0	72.8	89.7
73-069H	U.S.S.S.R.	10/02/73	10/03/73	GEOCENTRIC	312.0	204.0	72.8	89.7
73-070A	U.S.S.S.R.	10/03/73	10/04/73	GEOCENTRIC	312.0	204.0	72.8	89.7
73-071A	U.S.S.S.R.	10/06/73	10/07/73	GEOCENTRIC	312.0	212.0	65.4	89.5
73-072A	U.S.S.S.R.	10/10/73	10/11/73	GEOCENTRIC	300.0	213.0	72.9	90.0
73-073A	U.S.S.S.R.	10/15/73	10/16/73	GEOCENTRIC	294.0	206.0	65.0	89.3
73-074A	U.S.S.S.R.	10/16/73	10/17/73	GEOCENTRIC	366.0	215.0	72.9	90.0
73-075A	U.S.S.S.R.	10/16/73	10/17/73	GEOCENTRIC	1561.0	210.0	82.0	102.3
73-076A	U.S.S.S.R.	10/19/73	10/20/73	GEOCENTRIC	6000.0	500.0	62.6	736.0
73-077A	U.S.S.S.R.	10/20/73	10/21/73	GEOCENTRIC	365.0	213.0	72.9	90.0
73-078A	UNITED STATES	10/26/73	10/29/73	GEOCENTRIC	200857.0	141105.0	28.7	17279.0
73-079A	U.S.S.S.R.	10/27/73	10/28/73	GEOCENTRIC	300.0	213.5	72.9	90.1
73-080A	U.S.S.S.R.	10/29/73	10/30/73	GEOCENTRIC	647.0	624.0	61.2	97.2
73-081A	UNITED STATES	10/30/73	10/31/73	GEOCENTRIC	1139.0	902.0	90.2	106.0
73-082A	U.S.S.S.R.	10/30/73	10/31/73	GEOCENTRIC	1477.0	265.0	74.0	102.0
73-083A	U.S.S.S.R.	10/31/73	11/01/73	GEOCENTRIC	424.0	221.0	62.6	90.7
73-084A	U.S.S.S.R.	11/02/73	11/03/73	GEOCENTRIC	39310.0	657.0	62.9	709.9
73-085A	UNITED STATES	11/03/73		VENUS FLYBY				
73-086A	UNITED STATES UNITED STATES	11/06/73	06/25/74	GEOCENTRIC	1509.3	1500.0	102.0	116.0
73-087A	U.S.S.S.R.	11/10/73	11/11/73	GEOCENTRIC	364.0	214.0	72.9	90.0
73-088A	UNITED STATES	11/10/73	11/11/73	GEOCENTRIC	275.0	159.0	96.9	88.9
73-088B	UNITED STATES	11/10/73	11/11/73	GEOCENTRIC	257.0	159.0	96.9	88.7
73-088D	UNITED STATES	11/10/73	11/11/73	GEOCENTRIC	508.0	486.0	96.3	94.6
73-089A	U.S.S.S.R.	11/14/73	11/15/73	GEOCENTRIC	39197.0	400.0	65.0	702.0
73-090A	UNITED STATES	11/16/73	11/17/73	GEOCENTRIC	435.0	435.0	50.0	90.0
73-091A	U.S.S.S.R.	11/20/73	11/21/73	GEOCENTRIC	520.0	281.0	71.0	93.2
73-092A	U.S.S.S.R.	11/21/73	11/22/73	GEOCENTRIC	370.0	207.0	70.0	90.0
73-093A	U.S.S.S.R.	11/27/73	11/28/73	GEOCENTRIC	560.0	515.0	74.0	95.2
73-094A	U.S.S.S.R.	11/28/73	11/30/73	GEOCENTRIC	401.0	270.0	71.0	92.1
73-095A	U.S.S.S.R.	11/28/73	11/29/73	GEOCENTRIC	371.0	214.0	72.9	90.1
73-096A	U.S.S.S.R.	11/30/73	12/01/73	GEOCENTRIC	295.0	195.0	51.6	89.1
73-097A	U.S.S.S.R.	11/30/73	12/01/73	GEOCENTRIC	40029.0	460.0	62.7	737.0
73-098A	U.S.S.S.R.	12/04/73	12/05/73	GEOCENTRIC	130.0	770.0	74.0	100.7
73-099A	U.S.S.S.R.	12/13/73	12/14/73	GEOCENTRIC	859.0	280.0	71.0	95.7
73-100A	UNITED STATES	12/13/73	01/05/74	GEOCENTRIC	36475.0	3506.0	2.7	1435.2
73-100B	UNITED STATES	12/13/73	01/07/74	GEOCENTRIC	36299.0	3349.0	2.3	1438.0
73-101A	UNITED STATES	12/16/73	07/10/74	GEOCENTRIC	3039.4	135.3	68.1	117.9
73-102A	U.S.S.S.R.	12/17/73	12/18/73	GEOCENTRIC	395.0	214.0	72.9	89.9
73-103A	U.S.S.S.R.	12/18/73	12/19/73	GEOCENTRIC	272.0	225.0	51.6	89.2
73-104A	U.S.S.S.R.	12/19/73	12/20/73	GEOCENTRIC	1486.0	1336.0	74.0	114.0
73-104B	U.S.S.S.R.	12/19/73	12/20/73	GEOCENTRIC	1409.0	1446.0	74.0	115.3
73-104C	U.S.S.S.R.	12/19/73	12/20/73	GEOCENTRIC	1493.0	1423.0	74.0	115.1
73-104D	U.S.S.S.R.	12/19/73	12/21/73	GEOCENTRIC	1495.0	1461.0	74.0	115.0
73-104E	U.S.S.S.R.	12/19/73	12/20/73	GEOCENTRIC	1485.0	1410.0	74.0	114.0
73-104F	U.S.S.S.R.	12/19/73	12/20/73	GEOCENTRIC	1407.0	137.0	74.0	114.4
73-104G	U.S.S.S.R.	12/19/73	12/20/73	GEOCENTRIC	1407.0	1309.0	74.0	114.6
73-104H	U.S.S.S.R.	12/19/73	12/20/73	GEOCENTRIC	1474.0	1366.0	74.0	114.2
73-105A	U.S.S.S.R.	12/21/73	12/22/73	GEOCENTRIC	346.0	214.0	72.0	89.6
73-106A	U.S.S.S.R.	12/25/73	12/26/73	GEOCENTRIC	40609.0	480.0	62.9	737.0

SPACECRAFT NAME	NSSDC ID	FUNDING COUNTRY	SPACECRAFT LAUNCHED					PERIOD	SPACECRAFT NAME
			LAUNCH DATE	EPOCH DATE	ORBIT TYPE	APDAPSIS	PERIAPSIS		
OREOL 2	73-107A	U.S.S.R.	12/26/73	12/27/73	GEOCENTRIC	1995.0	487.0	74.0	109.2
COSMOS 626	73-108A	U.S.S.R.	12/27/73	12/29/73	GEOCENTRIC	259.0	257.0	65.0	89.7
COSMOS 627	73-109A	U.S.S.R.	12/29/73	12/30/73	GEOCENTRIC	1019.0	974.0	83.0	105.1
COSMOS 628	74-001A	U.S.S.R.	01/17/74	01/18/74	GEOCENTRIC	1026.0	976.0	83.0	105.0
SKYNET 2A	74-002A	UNITED KINGDOM UNITED STATES	01/19/74	01/20/74	GEOCENTRIC	3406.0	96.0	37.6	121.5
COSMOS 629	74-003A	U.S.S.R.	01/24/74	01/25/74	GEOCENTRIC	315.0	202.0	62.0	89.4
COSMOS 630	74-004A	U.S.S.R.	01/30/74	01/31/74	GEOCENTRIC	367.0	213.0	72.4	90.0
COSMOS 631	74-005A	U.S.S.R.	02/06/74	02/07/74	GEOCENTRIC	505.0	522.0	74.0	90.3
COSMOS 632	74-006A	U.S.S.R.	02/12/74	02/13/74	GEOCENTRIC	333.0	184.0	65.0	89.4
1974-007A	74-007A	UNITED STATES	02/13/74	02/15/74	GEOCENTRIC	393.0	134.0	110.4	89.8
TANSEI 2	74-008A	JAPAN	02/16/74	02/17/74	GEOCENTRIC	3236.0	200.0	31.2	121.0
SAN MARCO 4	74-009A	UNITED STATES ITALY	02/18/74	02/11/74	GEOCENTRIC	031.5	241.5	2.9	95.4
COSMOS 633	74-010A	U.S.S.R.	02/27/74	02/27/74	GEOCENTRIC	516.0	200.0	71.0	92.2
METEOR 10	74-011A	U.S.S.R.	03/09/74	03/09/74	GEOCENTRIC	094.0	832.0	01.2	102.2
COSMOS 634	74-012A	U.S.S.R.	03/09/74	03/07/74	GEOCENTRIC	491.0	271.0	70.9	92.2
UK-XA	74-013A	UNITED KINGDOM	03/08/74	03/13/74	GEOCENTRIC	916.0	714.0	97.8	101.2
COSMOS 635	74-014A	U.S.S.R.	03/14/74	03/15/74	GEOCENTRIC	350.0	212.0	72.9	89.8
1974-015A	74-015A	UNITED STATES	03/16/74	03/16/74	GEOCENTRIC	077.0	782.0	98.9	101.5
COSMOS 636	74-016A	U.S.S.R.	03/20/74	03/21/74	GEOCENTRIC	409.0	174.0	69.0	90.0
COSMOS 637	74-017A	U.S.S.R.	03/26/74	03/26/74	GEOCENTRIC	230.0	178.0	51.5	88.5
COSMOS 638	74-018A	U.S.S.R.	04/03/74	04/04/74	GEOCENTRIC	325.0	198.0	51.8	89.4
COSMOS 639	74-019A	U.S.S.R.	04/04/74	04/05/74	GEOCENTRIC	230.0	209.0	81.3	89.0
1974-020A	74-020A	UNITED STATES	04/10/74						NDA4 3
1974-020B	74-020B	UNITED STATES	04/10/74						COSMOS 607
1974-020C	74-020C	UNITED STATES	04/10/74						1973-008A
COSMOS 640	74-021A	U.S.S.R.	04/11/74	04/12/74	GEOCENTRIC	236.0	205.0	81.3	88.9
WESTAR 1	74-022A	UNITED STATES	04/13/74	04/14/74	GEOCENTRIC	35592.0	35166.0	0.5	1415.3
MOLNIYA 1/27	74-023A	U.S.S.R.	04/20/74	04/21/74	GEOCENTRIC	40713.0	646.0	62.9	730.0
COSMOS 641	74-024A	U.S.S.R.	04/23/74	04/24/74	GEOCENTRIC	1500.0	1305.0	74.0	114.5
COSMOS 642	74-024B	U.S.S.R.	04/23/74	04/24/74	GEOCENTRIC	1500.0	1305.0	74.0	114.5
COSMOS 643	74-024C	U.S.S.R.	04/23/74	04/24/74	GEOCENTRIC	1500.0	1305.0	74.0	114.5
COSMOS 644	74-024D	U.S.S.R.	04/23/74	04/24/74	GEOCENTRIC	1500.0	1305.0	74.0	114.5
COSMOS 645	74-024E	U.S.S.R.	04/23/74	04/24/74	GEOCENTRIC	1500.0	1305.0	74.0	114.5
COSMOS 646	74-024F	U.S.S.R.	04/23/74	04/24/74	GEOCENTRIC	1500.0	1305.0	74.0	114.5
COSMOS 647	74-024G	U.S.S.R.	04/23/74	04/24/74	GEOCENTRIC	1500.0	1305.0	74.0	114.5
COSMOS 648	74-024H	U.S.S.R.	04/23/74	04/24/74	GEOCENTRIC	1500.0	1305.0	74.0	114.5
METEOR 17	74-025A	U.S.S.R.	04/24/74	04/25/74	GEOCENTRIC	907.0	877.0	81.2	102.0
MOLNIYA 2/ 9	74-026A	U.S.S.R.	04/26/74	04/27/74	GEOCENTRIC	40850.0	403.0	62.9	737.0
COSMOS 649	74-027A	U.S.S.R.	04/29/74	04/30/74	GEOCENTRIC	320.0	189.0	62.8	89.3
COSMOS 650	74-028A	U.S.S.R.	04/29/74	04/30/74	GEOCENTRIC	1413.0	1300.0	74.0	113.5
COSMOS 651	74-029A	U.S.S.R.	05/15/74	05/16/74	GEOCENTRIC	276.0	256.0	65.0	89.6
COSMOS 652	74-030A	U.S.S.R.	05/15/74	05/16/74	GEOCENTRIC	309.0	196.0	65.0	89.7
COSMOS 653	74-031A	U.S.S.R.	05/15/74	05/16/74	GEOCENTRIC	309.0	196.0	62.8	89.3
COSMOS 654	74-032A	U.S.S.R.	05/17/74	05/18/74	GEOCENTRIC	277.0	261.0	65.0	89.7
SMS-A	74-033A	UNITED STATES	05/17/74	07/07/74	GEOCENTRIC	35841.5	35732.0	1.9	1436.1
INTERCOSMOS 11	74-034A	U.S.S.R.	05/17/74	05/18/74	GEOCENTRIC	526.0	484.0	50.7	94.5
COSMOS 655	74-035A	U.S.S.R.	05/21/74	05/22/74	GEOCENTRIC	549.0	520.0	74.0	95.2
COSMOS 656	74-036A	U.S.S.R.	05/27/74	05/28/74	GEOCENTRIC	354.0	194.0	51.6	89.7
LUNA 22	74-037A	U.S.S.R.	05/29/74						COSMOS 622
COSMOS 657	74-038A	U.S.S.R.	05/30/74	05/31/74	GEOCENTRIC	317.0	182.0	62.0	89.2
ATS 6	74-039A	UNITED STATES	05/30/74	05/30/74	GEOCENTRIC	42160.0	42157.0	1.0	1440.0
HAWKEYE 1	74-040A	UNITED STATES	06/03/74	09/16/74	GEOCENTRIC	132130.0	8025.0	80.8	3077.0
COSMOS 658	74-041A	U.S.S.R.	06/06/74	06/07/74	GEOCENTRIC	304.0	206.0	65.0	89.4

SPACECRAFT NAME	NSSC ID	FUNDING COUNTRY	SPACECRAFT LAUNCHED		ORBIT TYPE	APOAPSIS	PERIAPSIS	INCLINATION	PERIOD
			LAUNCH DATE	EPOCH DATE					
1974-042A	74-042A	UNITED STATES	06/08/74						
COSMOS 659	74-043A	U.S.S.R.	06/13/74	06/14/74	GEOCENTRIC	360.0	190.0	62.8	17.7
COSMOS 660	74-044A	U.S.S.R.	06/18/74	06/19/74	GEOCENTRIC	1995.0	409.0	83.0	109.2
COSMOS 661	74-045A	U.S.S.R.	06/21/74	06/22/74	GEOCENTRIC	555.0	513.0	74.0	95.0
SALUTE 3	74-046A	U.S.S.R.	06/25/74	06/26/74	GEOCENTRIC	270.0	219.0	51.6	89.1
COSMOS 662	74-047A	U.S.S.R.	06/26/74						
COSMOS 663	74-048A	U.S.S.R.	06/27/74						
COSMOS 664	74-049A	U.S.S.R.	06/29/74						
COSMOS 665	74-050A	U.S.S.R.	06/29/74	06/30/74	GEOCENTRIC	30384.0	633.0	62.0	1210.0
SPYUZ 14	74-051A	U.S.S.R.	07/03/74	07/04/74	GEOCENTRIC	277.0	20.0	51.6	89.7
MEYER 18	74-052A	U.S.S.R.	07/09/74	07/10/74	GEOCENTRIC	905.0	677.0	81.2	102.6
COSMOS 666	74-053A	U.S.S.R.	07/12/74	07/13/74	GEOCENTRIC	351.0	191.0	62.0	89.6
1974-054A	74-054A	UNITED STATES	07/14/74						
AFROS 2	74-055A	FED. REP. OF GERMANY UNITED STATES	07/16/74	08/06/74	GEOCENTRIC	840.2	216.8	97.4	95.2
MOLNIYA 2/10	74-056A	U.S.S.R.	07/23/74	07/24/74	GEOCENTRIC	40900.0	460.0	62.6	737.0
COSMOS 667	74-057A	U.S.S.R.	07/25/74	07/26/74	GEOCENTRIC	342.0	182.0	65.0	89.7
COSMOS 668	74-058A	U.S.S.R.	07/25/74	07/26/74	GEOCENTRIC	619.0	267.0	71.0	92.2
COSMOS 669	74-059A	U.S.S.R.	07/26/74						
MOLNIYA 1/28	74-060A	U.S.S.R.	07/29/74	07/30/74	GEOCENTRIC	35850.0	39850.0	0.1	1439.0
COSMOS 670	74-061A	U.S.S.R.	08/06/74	08/07/74	GEOCENTRIC	307.0	217.0	60.6	89.5
COSMOS 671	74-062A	U.S.S.R.	08/07/74	08/08/74	GEOCENTRIC	369.0	191.0	62.8	89.7
1974-063A	74-063A	UNITED STATES	08/09/74						
COSMOS 672	74-064A	U.S.S.R.	08/12/74	08/13/74	GEOCENTRIC	239.0	198.0	51.8	88.6
1974-065A	74-065A	UNITED STATES	08/14/74						
COSMOS 673	74-066A	U.S.S.R.	08/16/74	08/17/74	GEOCENTRIC	640.0	620.0	81.0	97.0
SPYUZ 15	74-067A	U.S.S.R.	08/26/74	08/27/74	GEOCENTRIC	275.0	254.0	51.6	89.6
COSMOS 674	74-068A	U.S.S.R.	08/29/74	08/30/74	GEOCENTRIC	343.0	182.0	65.0	89.5
COSMOS 675	74-069A	U.S.S.R.	08/29/74						
ANS	74-070A	NETHERLANDS UNITED STATES	08/30/74	08/31/74	GEOCENTRIC	1167.0	254.0	90.1	99.0
COSMOS 676	74-071A	U.S.S.R.	09/11/74	09/12/74	GEOCENTRIC	840.0	799.0	74.0	101.0
COSMOS 677	74-072A	U.S.S.R.	09/19/74	09/20/74	GEOCENTRIC	1519.0	1451.0	74.0	115.3
COSMOS 678	74-072B	U.S.S.R.	09/19/74	09/20/74	GEOCENTRIC	1519.0	1451.0	74.0	115.3
COSMOS 679	74-072C	U.S.S.R.	09/19/74	09/20/74	GEOCENTRIC	1519.0	1451.0	74.0	115.3
COSMOS 680	74-072D	U.S.S.R.	09/19/74	09/20/74	GEOCENTRIC	1519.0	1451.0	74.0	115.3
COSMOS 681	74-072E	U.S.S.R.	09/19/74	09/20/74	GEOCENTRIC	1519.0	1451.0	74.0	115.3
COSMOS 682	74-072F	U.S.S.R.	09/19/74	09/20/74	GEOCENTRIC	1519.0	1451.0	74.0	115.3
COSMOS 683	74-072G	U.S.S.R.	09/19/74	09/20/74	GEOCENTRIC	1519.0	1451.0	74.0	115.3
COSMOS 684	74-072H	U.S.S.R.	09/19/74	09/20/74	GEOCENTRIC	1519.0	1451.0	74.0	115.3
COSMOS 685	74-073A	U.S.S.R.	09/20/74	09/21/74	GEOCENTRIC	303.0	208.0	65.0	89.4
COSMOS 686	74-074A	U.S.S.R.	09/26/74	09/27/74	GEOCENTRIC	515.0	281.0	71.0	92.2

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4.2 SPACECRAFT AND EXPERIMENTS THAT BECAME OPERATIONAL OFF

The following table identifies spacecraft and/or experiments placed in an operational off status between October 1, 1973, and September 30, 1974, inclusive. The table is ordered alphabetically by spacecraft common name. For each spacecraft listed, the following information appears: the spacecraft common name, the NSSDC ID code, the spacecraft funding country/countries, the launch date, the date the spacecraft was placed in an operational off mode, the orbit type, and the spacecraft orbit parameters (epoch date, apoapsis, periapsis, inclination, and period). The distance and time parameters are shown in km altitude and minutes except for heliocentric-type orbits, which are shown in AU radial and days.

Operational off experiments are listed immediately below their associated spacecraft entry. The experiment NSSDC ID code, the principal investigator's or team leader's last name, the NSSDC experiment name, and the date the experiment was placed in an operational off mode are given for each experiment. To indicate that a spacecraft was not placed in an operational off mode, even though some of its experiments were in such a mode, the column indicating the spacecraft operational off mode date will appear blank.

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SPACECRAFT AND EXPERIMENTS THAT BECAME OPERATIONAL OFF

SPACECRAFT NAME	NSDDC ID	FUNDING COUNTRY	LAUNCH DATE	DATE S/C PLACED ON OFF	EPOCH DATE	ORBIT TYPE	APD-APGIC	PERI-APGIC	INCL-NATION	PERIOD
ATS 3	67-111A	UNITED STATES	11/02/67	/ /	11/06/67	GEOCENTRIC	35705.0	35330.0	0.5	1422.0
	67-111A-02	DAROSA				RADIO BEACON				
HINDUS 4	70-026A	UNITED STATES	04/00/70	/ /	09/07/73	GEOCENTRIC	1099.3	1087.5	99.8	107.1
	70-026A-01	HEATH				SOLAR UV MONITOR				
S-CUSED A	71-096A	UNITED STATES	11/10/71	09/30/74	09/06/73	GEOCENTRIC	29175.8	281.3	3.5	438.1
	71-096A-01	HOFFMAN				CHANNEL ELECTRON MULTIPLIERS WITH ELECTROSTATIC ANALYZERS				
	71-096A-02	FRITZ				SOLID-STATE PROTON-ALPHA PARTICLE TELESCOPE				
	71-096A-03	WILLIAMS				SOLID-STATE DETECTORS				
	71-096A-05	CAMILL JR.				SEARCH COIL MAGNETOMETER				
	71-096A-07	GURNETT				AC ELECTRIC FIELD MEASUREMENT				

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4.3 SPACECRAFT AND EXPERIMENTS THAT BECAME INOPERABLE

The following table identifies spacecraft and/or experiments that became inoperable during the time interval between October 1, 1973, and September 30, 1974, inclusive. The table is ordered alphabetically by spacecraft common name. For each spacecraft listed, the following information appears: the spacecraft common name, the NSSDC ID code, the spacecraft funding country/countries, the launch date, the date the spacecraft became inoperable, the orbit type, and the spacecraft orbit parameters (epoch date, apoapsis, periapsis, inclination, and period). The distance and time parameters are shown in km altitude and minutes except for heliocentric-type orbits, which are shown in AU radial and days.

Experiments that have become inoperable are listed immediately below their associated spacecraft entry. The experiment NSSDC ID code, the principal investigator's or team leader's last name, the NSSDC experiment name, and the date the experiment became inoperable are given for each experiment. To indicate that a spacecraft was not placed in an inoperable mode, even though some of its experiments were in such a mode, the column indicating the spacecraft inoperable date will appear blank.

When a prelaunch NSSDC ID code appears without a postlaunch NSSDC ID code, the particular spacecraft failed to orbit and was, therefore, not assigned an international designation.

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SPACECRAFT AND EXPERIMENTS THAT BECAME INSUPERABLE

SPACECRAFT NAME	NSDC ID	FUNDING COUNTRY	LAUNCH DATE	DATE S/C PLACED INOP	EPOCH DATE	ORBIT TYPE	APC-APPSIS	PERI-APPSIS	INCLIN-NATION	PERIOD
EXPERIMENTER	EXPERIMENT NAME	DATE EXP PLACED INOP								
APOLLO 15 LM/ALSEP	71-063C UNITED STATES	07/26/71 / /	LUNAR LANDER							
	71-063C-03 DYSL	LUNAR SURFACE MAGNETOMETER	12/09/73							
APOLLO 17 LM/ALSEP	72-096C UNITED STATES	12/07/72 / /	LUNAR LANDER							
	72-096C-08 HOFFMAN	ATMOSPHERIC COMPOSITION	10/17/73							
ATC 6	74-039A UNITED STATES	05/30/74 / /	05/30/74 GEOCENTRIC	42160.0	42157.0	1.5	1440.0			
	74-039A-03 ARNOOLDY	LOW-ENERGY PROTON/ELECTRON EXPERIMENT	05/01/74							
	74-039A-08 SHENK	GEOCHRONOUS VERY HIGH RESOLUTION RADIOMETER (GVHRR)	05/16/74							
ESRO 4	72-092A INTERNATIONAL	11/22/72 04/15/74 09/07/73 GEOCENTRIC	633.7	230.8	91.1	95.3				
	72-092A-01 BOYD	POSITIVE ION SPECTROMETER	04/15/74							
	72-092A-02 VON ZAHN	NEUTRAL MASS SPECTROMETER	04/15/74							
	72-092A-03 HULTQUIST	AURORAL PARTICLE SPECTROMETER	04/15/74							
	72-092A-04 DE JAGER	SOUTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER	04/15/74							
	72-092A-05 LUST	NORTHERN POLAR CAP SOLAR PARTICLE SPECTROMETER	04/15/74							
HEOS 2	72-008A INTERNATIONAL	01/31/72 06/05/74 00/19/73 GEOCENTRIC	236429.0	4405.3	87.9	7.0	0.3			
	72-008A-01 ELLIOT	FLUXGATE MAGNETOMETER	00/05/74							
	72-008A-02 RIZZELLA	ELECTRON AND PROTON MEASUREMENTS (20 EV-50 KEV)	00/02/74							
	72-008A-03 PETERS	SOLAR VLF OBSERVATION	00/02/74							
	72-008A-04 PAGE	PARTICLE COUNTER TELESCOPE	00/02/74							
	72-008A-05 OILWORTH	HIGH-ENERGY ELECTRONS	00/02/74							
	72-008A-06 ROSENDAUER	SOLAR WIND MEASUREMENTS (230 EV-16 KEV)	00/02/74							
	72-008A-07 RECHTIG	MICROWAVE RADIO DETECTOR	00/02/74							
OSO 7	71-083A UNITED STATES	09/26/71 07/09/74 09/04/73 GEOCENTRIC	424.7	247.5	33.1	91.8				
	71-083A-01 NEUPERT	X-RAY AND EUV SPECTROMETER (2 TO 400 A)	07/09/74							
	71-083A-02 TOLSEY	WHITE-LIGHT CORONOGRAPH AND EXTREME ULTRAVIOLET CORONOGRAPH	07/09/74							
	71-083A-03 PETERSON	COSMIC X-RAY EXPERIMENT	07/09/74							
	71-083A-04 CLARK	COSMIC X-RAY SOURCES IN THE RANGE 1.5 TO 4 A	07/09/74							
	71-083A-05 PETERSON	HARD SOLAR X-RAY MONITORING	07/09/74							

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APPENDIX A - DEFINITIONS

Several words and phrases are used in this report in a precise and specific sense. These terms are defined here to clarify the intended meaning to the reader.

- Active - As applied to a spacecraft mission or one of its experiments pertinent to this report, a general status-of-operation term that means the spacecraft or experiment has been launched and was last reported to NSSDC to be in either a "normal" or "partial" status.
- Apoapsis - The distance from the surface of the reference body to the furthest orbit point. This distance is expressed as astronomical units (AU) for heliocentric orbits, including planetary system flybys and escape trajectories from the solar system; e.g., Pioneers 10 and 11. The units are kilometers (km) of altitude for all other orbits.
- Approved Mission - A planned spacecraft mission status term that means the spacecraft mission has been approved and funding is or will be available to perform the mission.
- Experiment Brief Description - A description of an experiment containing a concise summary of the experiment purpose and instrument characteristics, emphasizing those relevant to the scientific use of the resulting data. Information about the performance of individual components of the instrumentation is often included.
- Inclination - The angle (in degrees) between the satellite orbital plane and the equatorial plane of the primary gravitational body. For satellites with heliocentric orbits, the ecliptic plane is used in lieu of the equatorial plane.

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Inoperable -

As applied to a spacecraft, a status-of-operation term that means the spacecraft is no longer capable of producing any useful scientific data because of malfunction or failure of the spacecraft system, completion of the phase of the spacecraft trajectory in which useful measurements could be performed, or network support (tracking, command, and telemetry) has been discontinued, etc. As applied to an experiment, a status-of-operation term that means the experiment is no longer capable of producing any useful scientific data because of a malfunction or failure of the experiment system or critical parts of the spacecraft system, or the completion of the phase of the spacecraft trajectory in which useful measurements could be performed.

Normal -

As applied to an active spacecraft, a status-of-operation term that means the spacecraft and other required systems are capable of working so that the data would be suitable for all of the scientific studies planned for the spacecraft when the spacecraft is turned on and the data are recorded. As applied to an active experiment, a status-of-operation term that means all experiment and spacecraft systems are working so that the data would be suitable for all of the scientific studies originally planned for the experiment.

NSSDC ID Code -

An identification code used in the NSSDC information system. In this system each successfully launched spacecraft and experiment is assigned a code based on the launch sequence of the spacecraft. Subsequent to 1962, this code; e.g., 72-012A for the spacecraft Pioneer 10, corresponds to the COSPAR international designation. The experiment codes are based on the spacecraft code. For example, the experiments carried aboard the spacecraft 73-019A (Pioneer 11) are numbered 73-019A-01, 73-019A-02, etc. Each prelaunch spacecraft and experiment is also assigned an NSSDC ID code based on the name of the spacecraft. For example, the proposed NASA launch, Mariner Jupiter/Saturn A, would be coded MARN77A. The experiments to be carried aboard this spacecraft

NSSDC ID Code - would be coded MARN77A-01, MARN77A-02, etc. Once
(continued) a spacecraft is launched, its prelaunch designation is changed to a postlaunch designation; e.g., Pioneer G, which was launched on April 6, 1973, was given the NSSDC ID code of 73-019A, corresponding to the launch spacecraft common name, Pioneer 11.

Operational Off - As applied to a spacecraft, a status-of-operation term that means the spacecraft can still be operated, but it is either turned off or not being used. As applied to an experiment, a status-of-operation term that means when last tested, the experiment and other required systems were capable of producing at least partially usable data, but the experiment is either turned off or telemetered data are not being recorded. The systems could be activated at some future time to obtain usable data.

Orbit Type - A word or phrase indicating the most important phase of the trajectory of a given spacecraft mission. The orbit type may be any one of the following: geocentric, selenocentric, heliocentric, Venuscentric, Marscentric, lunar lander, Venus lander, Mars lander, Jupiter lander, lunar flyby, Venus flyby, Mars flyby, Mercury flyby, and Jupiter flyby.

Partial - As applied to a spacecraft, a status-of-operation term that means the spacecraft and other required systems are working, but not all systems are working as well as the design required. If the spacecraft were turned on and the data recorded, the data would be suitable for only a portion of the scientific studies planned for the spacecraft. As applied to an experiment, a status-of-operation term defined similarly to that for a spacecraft.

Periapsis - The distance from the surface of the reference body to the nearest orbit point. This distance is expressed as astronomical units (AU) for heliocentric orbits, including planetary system flybys and escape trajectories from the solar system; e.g., Pioneers 10 and 11. The units are kilometers (km) of altitude for all other orbits.

- Planned - As applied to a future spacecraft mission pertinent to this report, a general status term that means the spacecraft mission was last reported to NSSDC as either "approved" or "proposed." As applied to an experiment, a term that indicates an experiment is expected to fly on a planned spacecraft mission.
- Proposed Mission - A planned spacecraft mission status term that means the mission is under study; however, no funds have been approved to perform this mission.
- Spacecraft Brief Description - A spacecraft description containing a concise summary of the spacecraft mission, specifically outlining the overall objectives of the mission and the scientific studies being performed. Information about the performance of individual components of the spacecraft is often included.
- Standard - As applied to a spacecraft or experiment data acquisition rate, a term that means the data that can be processed and made available to the experimenters are being acquired at the rate or percentage of coverage required to accomplish the planned scientific studies.
- Substandard - As applied to a spacecraft or experiment data acquisition rate, a term that means the data that can be processed and made available to the experimenters are not being acquired at the rate or percentage of coverage required to continue all the planned scientific studies.
- Unknown - As a general term, indicates information either unknown or unavailable at NSSDC.

A	angstrom	CAL	calorie
ACMA	Army Ballistic Missile Agency	CAL TECH	California Institute of Technology
ACAD	Academy	CALSFIERE	calibration sphere
ACIC	Aeronautical Chart and Information Center (now Defense Mapping Agency Aerospace Center)	CAN	Canada
ACS	attitude control system	CAS	Cooperating Applications Satellite (France-NASA)
AD	Dual Air Density Explorer (satellite, NASA)	CAV	composite analog video
A/D	analog to digital	CDA	command and data acquisition (station)
AE	Atmosphere Explorer (satellite, NASA)	CDC	Control Data Corporation
AEC	Atomic Energy Commission	CDS	cadmium sulfide
AEROPROPUL	aeropropulsion	CENS	Centre d'Etudes Nucleaires de Saclay (France)
AEROSAT	Aeronautical Satellite (NASA-ESRO)	CHEN	chemical
AEROSP	aerospace	CI	command module; centimeter
AFB	Air Force Base	CID	command
AFCRRL	Air Force Cambridge Research Laboratories	CNES	Centre National d'Etudes Spatiales (France)
AFO	Announcements of Flight Opportunities	CNET	Centre National d'Etudes des Telecommunications (France)
AFSC	Air Force Systems Command	CNRS	Centre National de la Recherche Scientifique (France)
ATC	automatic gain control	COTI	commission
AGNY	agency	COTISAT	Communications Satellite Corporation
AIMN	Anchored Interplanetary Monitoring Platform (satellite, NASA)	CONIE	Comision Nacional de Investigacion del Espacio (Spain)
ALOSYN	Alouette topside sounder synoptic (data)	CORSA	Cosmic-Ray Satellite (Japan)
ALFO	Apollo Lunar Polar Orbiter (satellite, NASA); Association of Lunar and Planetary Observers	COS	Cosmic-Ray Satellite (ESRO); cosmic
ALSEP	Apollo Lunar Surface Experiments Package (NASA)	COSPAR	Committee on Space Research
ALT	altitude	COUNC	council
AM	amplitude modulation	CPS	cycles per second
AMP	amper	CPU	central processing unit
AFPS	Atmosphere, Magnetosphere, and Plasmas in Space (satellite, NASA)	CRC	Communications Research Centre (Canada)
AMS	Army Map Service (now Defense Mapping Agency Topographic Center)	CRPL	Central Radio Propagation Laboratories (later ITSA; formerly part of ESSA; now NOAA/ERL)
AMISAT	Radio Amateur Satellite Corporation	CRREL	Cold Region Research & Engineering Laboratories
AMU	atomic mass unit; astronaut maneuvering unit	CRS	Commission for Space Research (Italy)
AMIK	Canadian Telecommunications Satellite; also referred to as TELESAT	CRT	cathode ray tube
ANNA	Army, Navy, NASA, Air Force (geodetic satellite)	CSI	cesium iodide
ANS	Astronomical Netherlands Satellite (Netherlands-NASA)	CSM	command service module
AOSO	Advanced Orbiting Solar Observatory	CTS	Canadian Telecommunications Satellite
AP	magnetic activity index A_p	CTR	center
APL	Applied Physics Laboratory of Johns Hopkins University	CZCS	coastal zone color scanner
APPL	application	DAC	data acquisition camera
APT	automatic picture transmission	DADE	Dual Air Density Explorer (satellite, NASA)
A/R	acquisition/reference	DAN	Danish
ARG	Ames Research Center (NASA)	DAPP	Defense Acquisition and Processing Program (DOD)
ARG-MIN	arc-minute	DASA	Defense Atomic Support Agency
ARG-SEC	arc-second	DATS	Despun Antenna Test Satellite (DOD)
ARDC	Air Research and Development Command (now AFSC)	DB	decibel
ARPA	Advanced Research Projects Agency	DCP	data collection platform
ARSP	Aerospace Research Support Program (USAF)	DCS	direct couple system; data collection system
AS-E	American Science & Engineering, Inc.	DEF	defense
ASOS	antimony-sulfide oxy-sulfide	DEG	degree
ASTP	Apollo-Soyuz Test Project (USSR-NASA)	DENPA	Density Phenomena (satellite, Japan)
ASTROPHYS	astrophysics	DEV	development
AT	atomic	DEVLR	Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt; English translation, Research Laboratory for Aeronautics and Astronautics, Fed Rep of Germany
ATCOS	Atmospheric Composition Satellite (NASA)	DIAL/MIKA	Diamond Allicando/Mini Kapsel (satellite, Fed Rep of Germany-France)
ATDA	Alternate Target Docking Adapter	DIAL/MIKA	Diamond Allicando/Wissenschaftliche Kapsel (satellite, Fed Rep of Germany-France)
ATH	Apollo Telescope Mount	DIAPO	diapason (satellite, France)
ATHOS	atmosphere; atmospheric	DIT	Drexel Institute of Technology
ATS	Applications Technology Satellite (NASA)	DMAAC	Defense Mapping Agency Aerospace Center
AT-T	American Telephone & Telegraph Corp.	DMAIC	Defense Mapping Agency Topographic Center
AU	astronomical unit	DME	Direct Measurements Explorer (satellite, NASA)
AUST	Australia	DISP	Defense Military Satellite Program (DOD)
AVCS	advanced vidicon camera system	DOD	Department of Defense
AVG	average	DODGE	Department of Defense Gravity Experiment (satellite, DOD)
AVIMU	advanced very high resolution radiometer	DRID	direct readout image dissector (camera system)
AWRE	Atomic Weapons Research Establishment (Australia)	DRIR	direct readout infrared radiometer
BOD	binary coded decimal	DRTE	Defense Research Telecommunications Establishment (now CRC)
BE	Beacon Explorer (satellite, NASA); beryllium	DSAP	Defense System Applications Program (DOD)
BEV	billion electron volts	DSCS	Defense Satellite Communications System (DOD)
BIC	barium iodide cloud	DSIR	Department of Science and Industrial Research (England)
BLOS	Biological Satellite (NASA)	DSN	Deep Space Network
BPI	bits per inch	DV	digital video
BPS	bits per second	DYN	dynamic
BTL	Bell Telephone Laboratories		
BUV	backscatter ultraviolet		
BV	billion volts		
B/W	black and white		
BWP	Bundesminister für Wissenschaftliche Forschung (Fed Rep of Germany)		

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E	energy	GED	Galactic Radiation Experiment Background (satellite, USN)
EASEP	Early Apollo Scientific Experiment Package	GRI	Groupe de Recherche Ionospherique (France)
ECS	Experimental Communications Satellite (NASA)	GRDC	Netherlands Committee for Geophysics and Space Research
EDS	Environmental Data Service (NOAA)	GRS	German Research Satellite (NASA-Fed Rep of Germany)
EGO	Eccentric (Orbiting) Geophysical Observatory (satellite, NASA)	GSD	Grid Sphere Drag (satellite, DOD)
EGRS	Engineers Satellite (DOD)	GSE	geocentric solar ecliptic (coordinate system)
EL	electric (data camera carried on Apollo)	GSFC	Goddard Space Flight Center (NASA)
ELDO	European Launch Development Organization (ESRO)	GSPI	geocentric solar magnetospheric (coordinate system)
ELEC	electric	.GT.	greater than
ELECTR	electronics	GUMS	Glavnoye Upravleniye Gidrometeorologicheskoi Sluzhby (Main Administration of the Hydrometeorological Service, USSR)
EUMS	Earth Limb Measurement Satellite (NASA-USAF)	GV	gigavolt
ENE	environmental measurement experiment	GWINR	geosynchronous very high resolution radiometer
ETR	Electromechanical Research (Company, England)		
ENVIRON	environment; environmental		
EOF	end of file		
EOGO	Eccentric Orbiting Geophysical Observatory (satellite, NASA)		
EOS	Earth Observation Satellite (NASA)		
EPE	Energetic Particle Explorer (satellite, NASA)		
E/Q	energy per unit charge	HAO	High Altitude Observatory
ERB	Earth radiation budget (experiment)	HCTI	Heat Capacity Map Mission (satellite, NASA)
ELEC	Earth Resources Data Center	HCR	Heat Capacity Mapping Radiometer
ENG	Earth Geodetic Satellite (USAF)	HCO	Harvard College Observatory
ENL	Environmental Research Laboratory (NOAA)	HDS	high data rate storage system
ENOS	Earth Resources Observation System	HE	helium
ENS	Environmental Research Satellite (USAF)	HEAO	High-Energy Astrophysical Observatory (NASA)
ENT	extended range telescope	HEOS	High-Eccentricity Earth-Orbiting Satellite (ESRO)
ENTS	Earth Resources Technology Satellite (NASA)	HETS	high-energy telescope system
ESGEO	ESRO Geostationary Earth-Orbiting (satellite)	HFE	heat-flow experiment; heat-flow electronics
ESMR	electrically scanning microwave radiometer	HR	high resolution; hour
ESOC	European Space Operations Centre (ESRO)	HRIR	high-resolution infrared radiometer
ESRO	European Space Research Organization	HRIRS	high-resolution infrared radiometer sounder
ESSA	Environmental Science Services Administration (now NOAA)	HS	high school
ESTABL	establishment	HYDROMET	hydrometeorological
ESTEC	European Space Technology Center (ESRO)	HZ	hertz (cycles per second)
ETR	Eastern Test Range (also referred to as Cape Canaveral)		
ETS	Engineering Test Satellite	IAP	Institute of Atmospheric Physics (USSR)
EUV	extreme ultraviolet	IDM	International Business Machines (Corp)
EV	electron volt	ICB	intercontinental ballistic missile
EVA	extravehicular activity	ICSU	International Council of Scientific Unions
EVN	Earth viewing (equipment) module	ID	identification
ELQS	Exospheric Satellite (Japan)	IDC	image dissector camera
EXOSAT	European X-ray Observation Satellite (ESRO)	IDCS	image dissector camera system
EXTRATER	extraterrestrial	IDCSP	Initial (or Interim) Defense Communication Satellite Program (or Project) (DOD)
		IDSCS	Initial Defense Satellite Communication System (DOD)
FARO	Flare-Activated Radiobiological Observatory (satellite, DOD)	IDT	instrument definition team
FED	Federal	IE	ionospheric Explorer (satellite, NASA-NES)
FLT-SAT	Fleet Satellite (USN)	IFOV	instrument field of view
FM	frequency modulation	IGRF	International Geomagnetic Reference Field
FMRT	final meteorological radiation tape	IGY	International Geophysical Year
FOUND	foundation	IME	International Magnetospheric Explorer (satellite, NASA-ESRO)
FOV	field of view	IMP	Interplanetary Monitoring Platform (satellite, NASA)
FPA	flat plate radiometer	INDASAT	Indian Scientific Satellite (ISRO-USSR)
FR	French Research (satellite, France)	INOP	inoperable
FRG	Flight Research Center (NASA)	INSAT	Indian National Satellite (ISRO-USSR)
FSC	FLEETSATCOM (satellite, USN-USAF)	INST	institute
FSK	frequency shift key	INTA	Instituto Nacional de Tecnica Aeroespacial (Spain); the National Institute of Aerospace Science
FWM	full width at half maximum	INTASAT	satellite (INTA, Spain)
FWS	filter wedge spectrometer	INTELSAT	International Telecommunications Satellite (NASA-CO/SAT)
		INCOMP	Ionospheric Composition (satellite--see DIAP)
GARP	Global Atmospheric Research Program	IPA	Institute for Physics of the Atmosphere (SA)
GCA	Geophysics Corporation of America	IQSY	International Quiet Sun Year
GE	General Electric (Company)	IR	infrared
.GB.	greater than or equal to	IRDM	Intermediate range ballistic missile
GENS	Geostationary European Meteorological Satellite (ESRO)	IRIG	Inter-Range Instrumentation Group
GEOPHYS	geophysical	IRIS	infrared-interferometer spectrometer; International Radiation Investigation Satellite (NASA-ESRO)
GEOS	Geodetic Earth-Orbiting Satellite (NASA); Geostationary Earth-Orbiting Satellite (ESRO)	IRLS	interrogation, recording, and location system
GES FUR	Geophysikalische Fernstudien (Center for Space Research, Fed Rep of Germany)	IRR	infrared radiometry
HELTRAM-FORSCHE		INTEN	infrared transmission
G.E.T.	ground elapsed time	ISAS	Institute of Space & Aeronautical Science (Japan)
GOSE	gravity gradient stabilization experiment	ISEE	International Sun-Earth Explorer (satellite, NASA-ESRO)
GIZ	gigahertz	ISIS	International Satellite for Ionospheric Studies (NASA-Canada)
GISS	Goddard Institute for Space Studies (NASA)		
GN	Geiger-Mueller; gram		
GNS	Geostationary Meteorological Satellite (Japan)		
GNT	Greenwich mean time		
GOES	Geosynchronous Operational Environmental Satellite (NASA-NOAA; also called SMS)		
GP	Gravitational Redshift Space Probe (NASA)		
GRAVR	Gravitational Redshift Space Probe (NASA)		
GRE	ground reconstruction equipment; ground reconstruction electronics		

ISRO	Indian Space Research Organization	ISEC	millisecond
ISS	Ionospheric Sounding Satellite (Japan)	ISFC	Marshall Space Flight Center (NASA)
ITCZ	Intertropical convergence zone	ISN	mission
ITOS	Improved TIROS Operational Satellite (NOAA)	ISS	Magnetic Storm Satellite (NASA-AFCRL); multispectral scanner
ITPR	Infrared temperature profile radiometer		multicolor spin-scan cloudcover camera
ITR	Incremental tape recorder	ISSCC	Motoroid Technology Satellite (NASA)
ITSA	Institute for Telecommunication of Sciences and Aeronomy (formerly a subdivision of ESSA; now NOAA-ERL)	ITS	monitor of ultraviolet solar energy
IU	instrument unit	ISUE	milliwatt
IUE	International Ultraviolet Explorer (satellite, NASA-UK-ESRO)	ISV	
IZMIRAN	Institute of Terrestrial Magnetism and Aeronomy of the Academy of Sciences (USSR)	NA	not applicable; Hera Alice (satellite, DOD)
JHU	Johns Hopkins University	NACE	neutral atmosphere composition experiment
JPL	Jet Propulsion Laboratory (NASA)	NADUC	Nimbus/ATS Data Utilization Center
JSC	Johnson Space Center (NASA)	NASA	National Aeronautics and Space Administration (Washington, D.C., Headquarters)
		NASC	National Aeronautics and Space Council
		NASDA	National Space Development Agency (Japan)
		NATL	national
		NATO	North Atlantic Treaty Organization
KBS	kilobits per second	NBS	National Bureau of Standards
KEV	kiloelectron volt	NCAR	National Center for Atmospheric Research
KG	kilogram	NCC	National Climatic Center (NOAA)
KHZ	kilohertz	NDRS	Norwegian Defence Research Establishment
KM	kilometer	NEMS	Nimbus-E microwave spectrometer; Near-Earth Magnetospheric Satellite (ESRO)
KPI	magnetic activity index K _p	NESC	National Environmental Satellite Center (now NESS)
KPO	Kitt Peak National Observatory	NESS	National Environmental Satellite Service (NOAA)
KSC	Kennedy Space Center (NASA)	NGSP	National Geodetic Satellite Program
		NHC	National Hurricane Center
LA	Los Angeles	NHI	National Institutes of Health
LAB	Laboratory	NIC	National Meteorological Center
LACATE	lower atmosphere composition and temperature	NIRT	Nimbus meteorological radiation tape
LAGEOS	Laser Geodetic Earth-Orbiting Satellite (NASA)	NIN	no national name
LARC	Langley Research Center (NASA)	NINS	Navy Navigational Satellite System
LAS	Large Astronomical Satellite (ESRO)	NOAA	National Oceanic and Atmospheric Administration (formerly ESSA)
LASL	Los Alamos Scientific Laboratory	NOHSS	National Operational Meteorological Satellite System
LCS	Lincoln Calibration Sphere	NOHAD	North American Air Defense Command
LE	less than or equal to	NOIR	Norwegian
LEM	Lunar excursion module	NOIS	National Ocean Survey (NOAA)
LEPEDEA	low-energy proton and electron differential energy analyzer	NOIS	Naval Ordnance Test Station
LERC	Levitt Research Center (NASA)	NOIS	National Research Council
LES	Lincoln Experimental Satellite (DOD)	NRL	Naval Research Laboratory
LETS	low-energy telescope system	NSA	National Security Agency
LL	Lincoln Laboratory (MIT)	NSF	National Science Foundation
LM	Lunar module	NSA	National Space Science Data Center
LMD	Laboratory of Meteorological Dynamics	NSC	nuclear
LOFTI	Low-Frequency Trans-Ionospheric (satellite, USN-NRL)	NSC	Naval Weapons Laboratory
LOGACS	Low-G Accelerometer Calibration System (USAF)	NSL	National Weather Records Center (presently NCC)
LPSP	Laboratoire de Physique Stellaire et Planetaire (CNRS)	NRRC	
LMIR	limb radiance inversion radiometer; low-resolution infrared radiometer		
LRL	Lunar Receiving Laboratory (JSC)	OA	Office of Applications (NASA)
LRV	Lunar roving vehicle	OAO	Orbiting Astronomical Observatory (satellite, NASA)
LST	Large Space Telescope (satellite, NASA)	OAR	Office of Aerospace Research (USAF-AFSC)
LT	less than	OART	Office of Advanced Research and Technology (NASA)
LTV	Ling-Teneco-Vought (Company)	OAST	Office of Aeronautics and Space Technology (NASA)
		OBS	observatory
M	meter, milli- (prefix)	OCC	Orbiting Command Center
MA	Mercury Atlas	OFO	Orbiting Frog Otolith (NASA experimental spacecraft)
MAPS	measurement of air pollution from satellite	OGO	Orbiting Geophysical Observatory (satellite, NASA)
MARINETS	Modified Advanced Research Environmental Test Satellite (USAF)	OI	other investigator
MAS	Ministry of Aviation Supply (UK)	OTNI	low-resolution omnidirectional radiometer (on Explorer 7)
MASC	magnetic attitude spin coil	OSMF	Office of Manned Space Flight (NASA)
MASS	Massachusetts	OTR	Office of Naval Research
MATER	material	OPEP	orbital-plane experiment package
MD	millibar	OPLE	Omega position and location experiment
ME	megacycle	OP OFF	operational off
MED	medicine; medical	ORBIS	Orbiting Radio Beacon Ionospheric Satellite (NASA)
METEC	Meteoroid Technology (satellite, NASA)	OTS	Octahedral Research Satellite (NASA); Orbiting Research Satellite (DOD)
METEOSAT	Meteorological Satellite (ESRO)	OSCAR	Orbiting Satellite Carrying Amateur Radio
MEV	million electron volts	OSO	Orbiting Solar Observatory (satellite, NASA)
MG	milligram	OSS	Office of Space Science (NASA)
MOZ	megahertz	OSSA	Office of Space Science and Applications (NASA; now two separate offices)
MODAS	Missile Defense Alarm System (USAF)	OT	Operational TIROS (satellite, NASA)
MIN	minute	OTDA	Office of Tracking and Data Acquisition (NASA)
MIT	Massachusetts Institute of Technology	OV	Orbiting Vehicle (satellite, USAF)
MJS	Mariner Jupiter/Saturn (spacecraft, NASA)		
MI	millimeter		
MOL	Manned Orbiting Laboratory (satellite, DOD)		
MI-P	minus to plus		
MPI	Max-Planck-Institut (Fed Rep of Germany)		
MR	medium resolution		
MRIR	medium-resolution infrared radiometer		
MS	microsecond		
MSC	Manned Spacecraft Center (now Johnson Space Center)		

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PAC	Packaged Attitude Control (satellite to, NASA)	SIUS	Salik Institute for Biological Studies
PAET	Planetary Atmosphere Experiment Test	SIDS	Space Investigations Documentation System
PAGIOS	Passive Geodetic Earth-Orbiting Satellite (NASA)	SIH	(NASA)
PAN	pulse amplitude modulation	SIRS	scientific instrument module
PC1	pulse coded modulation	SI	satellite infrared spectrometer; System for
PE	Planetary Explorer	SICR	Information Retrieval and Storage (NSSDC)
PEP	platform electronic package	SIS	San Marco (satellite, NASA-Italy)
PFH	pulse frequency modulation	SIS	scanning multispectral microwave radiometer
PIASR	Personnel Hazards Associated with Space Radiation (satellite, USAF)	SIS	Synchronous Meteorological Satellite (NASA)
PIVS	physics	SNAP	systems for nuclear auxiliary power
PI	principal investigator	SOEP	solar-oriented experiment package
PIXEL	picture element	SOLRAD	Solar Radiation (satellite, NASA-DOD)
PL	prelaunch	SPADES	Solar Perturbation and Atmospheric Density Measurement Satellite (DOD)
PM	pulse modulation; photomultiplier	SPHINX	Space Plasma High Voltage Interactive Experiment (satellite, NASA)
PMI	pressure modulation radiometer; Pacific Missile Range	SPH	solar proton monitor
PMT	photomultiplier tube	SR	Solar Radiation (satellite, NASA); scanning radiometer; sounding rocket
P-N	positive-negative (junction)	SRATS	Solar Radiation and Thermospheric Structure (satellite, Japan)
POGO	Polar Orbiting Geophysical Observatory (satellite, NASA)	SRC	Space Research Council; Science Research Council
PPS	pulses per second	SRI	Stanford Research Institute
PROT	protection	SRT	supporting research and technology
PS	pressure sensor	SSCC	spin-scan cloudcover camera
PSE	passive seismograph experiment	SSD	Space Science Division (JPL)
PTL	Photographic Technology Laboratory (JSC)	SS	Small Scientific Satellite (NASA)
		SST	satellite-to-satellite tracking
QWAC	quarter-orbit magnetic attitude control (system)	STADAN	Spacecraft Tracking and Data Acquisition Network (new STIR)
		STANAD	Starfish Radiation (satellite, NASA)
RA	Ranger (spacecraft, NASA)	STD	standard
RAD	radium; radiation	STEN	Spaceflight Tracking and Data Network (NASA)
RADCAT	Radar Calibration Target (satellite, ARPA)	STER	steradian
RADOSE	Radiation Dosimeter (satellite, DOD)	STI	Space Technology Laboratories (new TRW Systems Group)
RAE	Radio Astronomy Explorer (satellite, NASA)	STN	station
RAM	random access memory (system)	STP	Solar Terrestrial Probe (satellite, NASA); Solar Terrestrial Physics
RBV	return beam vidicon (camera)	STRATOS	stratosphere
RC	resistance capacitor	STUD	studios
RCA	Radio Corporation of America	SUI	State University of Iowa (now University of Iowa)
RVD	research and development	SURCAL	Surveillance Calibration (satellite, DOD)
REP	republic	SVC	southwest
RES	research	SW	Sine Wave Response Filter (program)
REKS	Radio Exploration Satellite (Japan)	SNRF	Synchronous Communication (satellite, NASA) system
RF	radio frequency	SYNCOI	
RI	Radiation Meteoroid (satellite, NASA); Radiometric Measurement (satellite, DOD)	SYST	
RIIS	root mean square; Radiation Meteoroid Satellite (NASA); Radiometric Measurement Satellite (DOD)	TAC	Technology Application Center
RPA	retarding potential analyzer	TACOMSAT	Tactical Communications Satellite (DOD)
RPN	revolutions per minute	TATS	Test and Training Satellite (NASA)
RPS	revolutions per second	TATSACOM	Tactical Satellite Communications (program, DOD)
RRL	Radio Research Laboratories (Japan)	TD	Thor-Delta (satellite, ESRO); launch vehicle (NASA-USAF)
RSCS	Radio and Space Research Station (England)	TD	Tracking Data Processor (program)
RTD	Research Technology Division (USAF)	TDN	tracking & data relay
RTG	radioisotope thermoelectric generator	TDHSS	tracking and data relay satellite system
RTS	real-time transmitter system	TEC	telemetry and command; transearth coast
		TECH	technical; technology
SAW	stratospheric aerosol measurement	TEI	transearth injection
SAWOS	Satellite Mission Observation System (satellite, USAF)	TELESAT	satellite, Canada (also referred to as ANIK)
SAHS	stratospheric and mesospheric sounder	TEMP	temporal; temperature
SAMSO	Space and Missile Systems Organization (USAF)	TET	telescope and electron telescope
SAO	Smithsonian Astrophysical Observatory	TEIR	Test and Training (satellite, NASA)
SAS	Small Astronomy Satellite (NASA); Soviet Academy of Sciences	THIR	temperature-humidity infrared radiometer
SATAR	Satellite for Aerospace Research (NASA)	THORAD-AGE	Thor Augmented Delta Agena (launch vehicle)
SATELL	satellite	TIME	Time Location System (USN)
SATS	Satellite Antenna Test System (NASA)	TIP	Tracking Impact Prediction (satellite, DOD)
SBRC	Santa Barbara Research Center	TIROS	Television and Infrared Observation Satellite (NASA)
SCANS	scanning microwave spectrometer	TL	team leader
SCEL	Signal Corps Engineering Laboratories	TLI	translunar injection
SCI	school	TM	team member
SCI	science	TOMS	total ozone mapping system
SCM	surface composition mapping radiometer	TOPO	topographic
SCORD	Signal Communication by Orbiting Relay Equipment (satellite, DOD)	TOPS	Thermal Noise Optical Optimization Communication System (NASA)
SCR	selective chopper radiometer	TOSI	topside (satellite, NASA)
SD	San Diego	TOS	TIROS Operational Satellite (or System) (NASA)
SE	Solar Explorer (satellite, NASA)	TOVS	TIROS operational vertical sounder
SEASAT	Ocean Dynamic Satellite (NASA)	TRAAC	Transit Research and Attitude Control (satellite, USN)
SEC	second; secondary electron conduction (vidicon tube)	TRANET	Doppler Tracking Network (USN)
SECOR	Sequential Collation of Range (satellite, USAF)	TRANSP	transportation
SEM	space environment monitor	TRS	Tetrahedral Research Satellite (USAF)
SEXT	Spinning Satellite for Electric Rocket Test (NASA)	TRN	Thompson, Ramo, Wooldridge, Inc
SESP	Space Experiment Support Program		
SESPQ	Space Environmental Support Project Office		
SHS	Soviet Hydrometeorological Service		

TTS	Test and Training Satellite (NASA) (also called TATS, TETR)
TWERLE	tropical wind energy conversion and reference level experiment
U	university
UCLA	University of California at Los Angeles
UHF	ultrahigh frequency
UK	United Kingdom
US	United States
USA	United States Army; United States of America
USAF	United States Air Force
USN	United States Navy
USSR	Union of Soviet Socialist Republics
UT	universal time
UV	ultraviolet
UVNO	ultraviolet nitric-oxide experiment
UVS	ultraviolet spectrometer
V	volt
VAR	variation
VHF	very high frequency
VHRM	very high resolution radiometer
VISSR	visible infrared spin-scan radiometer
VLF	very low frequency
VTPR	vertical temperature profile radiometer
W	wideband video tape recorder
WDC	World Data Center
WDC-A-RGS	World Data Center A for Rockets and Satellites
WEFAX	weather facsimile
WFC	Wallops Flight Center (NASA)
WGSPR	Working Group for Space Physics Research
WMO	World Meteorological Organization
WPM	words per minute
WRSAT	Weapons Research Establishment Satellite (Australia)
WS	Wallops Station (NASA; now Wallops Flight Center)
WSMR	White Sands Missile Range
WTR	Western Test Range (also referred to as Vandenberg AFB)
WWN	World Weather Watch
Z	atomic number

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